

Title Page

ANGLIA RUSKIN UNIVERSITY

FACULTY OF HEALTH, SOCIAL CARE & EDUCATION

THE CARRY-OVER EFFECTS OF
AQUATIC PHYSIOTHERAPY FOR PEOPLE WITH
MULTIPLE SCLEROSIS

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A thesis in partial fulfilment of the
requirements of Anglia Ruskin University
for the degree of Professional Doctorate.

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ANGLIA RUSKIN UNIVERSITY

ABSTRACT

FACULTY OF HEALTH, SOCIAL CARE & EDUCATION

PROFESSIONAL DOCTROATE

THE CARRY-OVER EFFECTS OF
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Context and Aim: Burrswood Health and Wellbeing Centre developed a new service of aquatic physiotherapy for people with Multiple Sclerosis (MS). The preliminary literature review identified a clear gap in the knowledge and justified the need for carrying out research on the perspectives of people with MS about the carry-over effects of aquatic physiotherapy. The main aim of this doctoral research is to explore, better understand and explain the perspectives of people with MS about the carry-over effects of aquatic physiotherapy.

Research Design: A pragmatic qualitative research approach using the Classic Grounded Theory methodology was employed. People with MS who completed a programme of six sessions of 1-to-1 aquatic physiotherapy at the Burrswood Health and Wellbeing Centre were invited to participate in this study. Participants' views were collected by using two qualitative data collection methods. These were 'letter to a friend' and semi-structured interview. The data were collected from 17 people with MS and were analysed by using the Constant Comparative Analysis. After the emergence of core category, a Grounded Theory literature review was completed and a theoretical framework was identified to contextualise the findings.

Research Findings: The research generated three categories: *Realising Potential, Positive Attitude and Enabling*; one core category: *Empowering*, and two theoretical codes: *Facilitating factor and Deterring factor*.

Research Conclusions: Discussion and integration of findings with the literature contributed to the development of 'Burrswood Conceptual Framework of Empowerment'. Although this framework has the potential to explain the carry-over effects of the aquatic physiotherapy for people with Multiple Sclerosis, it is important to acknowledge that the findings only represent the views of a small group of people with MS from a single private aquatic physiotherapy centre.

Key words: Aquatic Physiotherapy, Carry-over effects, Empowerment, Multiple Sclerosis.

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Presentations at conferences and events

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- Garikipati, K.K., 2018. Presentation of the professional doctorate research findings to physiotherapists and physiotherapy assistants. *Burrswood Health and Wellbeing centre*. 20 April 2018. Groombridge, UK.
- Garikipati, K.K., 2018. Presentation of the professional doctorate research findings to physiotherapists, physiotherapy assistants and people with MS. *Burrswood Health and Wellbeing centre*. 17 July 2018. Groombridge, UK.

Foreword

I am a qualified physiotherapist with experience in the rehabilitation of long-term neurological diseases. I worked as a clinical physiotherapist and lecturer during the last twenty years. I am currently working as a senior lecturer in Physiotherapy at the University of Brighton. I have particular interest in the rehabilitation of people with long-term neurological conditions. One of the primary areas of my interests and focus of my research has been around the benefits of physiotherapy for people with Multiple Sclerosis (MS). My teaching commitments have involved delivering lectures, tutorials and physiotherapy practical skills sessions on the topics related to MS.

To enhance the standard of teaching and improve the quality of understanding of students on the topic of Multiple Sclerosis, I have invited service users from the local support group of the Multiple Sclerosis Society, United Kingdom. Along with students, I attended these sessions every year. I have also attended patient information days organised by the support groups. Service user talks have inspired me and helped me to appreciate the importance of conducting further research by exploring the experience and perceptions of people with MS. During my tenure at University of Brighton, I have completed some physiotherapy research projects on MS. Besides conducting my own research, during the course of my career at this University, I have encouraged physiotherapy students to conduct research projects and literature reviews on MS. I have supervised student research projects that were aimed at exploring the benefits of physiotherapy for people with MS. The knowledge gained from these research projects has helped to expand my understanding of the benefits of physiotherapy for people with MS. I have been incorporating the findings of these projects in my teaching and disseminated some of these findings at international conferences such as the World Confederation of Physical Therapy (Garikipati, et al., 2011) and “Aqua-Leuven”: the second European Conference on Evidence Based Aquatic Therapy (Garikipati, et al., 2015).

In 2009, the Burswood Health and Wellbeing Centre in Tunbridge Wells, Kent, developed a new aquatic physiotherapy service for people with MS. To evaluate the benefits of this new service a small group of physiotherapists formed a research team called Multiple Sclerosis Aqua Research Team (MSART). Because of my interest in MS and the subject

expertise in the neurological physiotherapy, I was invited to join this team of physiotherapists with specific interest in the effects of aquatic physiotherapy. As an active member of the MSART, I have supervised a number of research projects that investigated the immediate effects of six sessions of aquatic physiotherapy on MS. MSART investigated the effects of aquatic intervention on the patient reported subjective measures such as fatigue and health-related quality of life and also therapist measured objective measures such as balance and gait. MSART also completed few qualitative research projects that explored the perspectives of people with MS who had undergone aquatic physiotherapy at the Burswood. Although I am not employed by the Burswood Health and Wellbeing Centre, I have been in close collaboration with this Centre as a member of the research team.

Multiple Sclerosis Aqua Research Team research projects identified the need to better understand and conduct further exploration on the effects of aquatic physiotherapy for people with MS. The gaps in the knowledge, my professional interest in MS, passion for research, personal and career growth plans motivated me to conduct this large scale doctoral level research. Albeit the steps completed in this doctoral research were very challenging, intellectually and emotionally, I thoroughly enjoyed the learning associated with each and every step of this six year journey. I hope the reader finds the research presented in this thesis is interesting and inspiring. I sincerely hope that the findings of this research will be useful for improving the aquatic physiotherapy services for people with Multiple Sclerosis.

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Chapter 1

Introduction

Chapter 1: Introduction

Multiple Sclerosis (MS) is a progressive and deteriorating autoimmune disorder of the central nervous system. MS is one of the most debilitating diseases affecting large number of younger adults across the globe. Although there have been some developments in the pharmacological management of MS symptoms, currently there is no cure for this disease. Physiotherapy plays an important role in the management of MS symptoms and rehabilitation. Besides providing hands-on therapy, physiotherapists also offer education, guidance and support for implementing effective self-management strategies. Aquatic physiotherapy is a form of water based therapy intervention offered by trained physiotherapists. Because of the unique properties of water, aquatic environment offers more exercising opportunities for people with disabilities. Although aquatic physiotherapy is considered as a useful therapy by patients and physiotherapists, and also offered as an intervention in the National Health Service of the United Kingdom, the available evidence on the effectiveness of this intervention on Multiple Sclerosis problems is limited. There is no evidence on the perspective of people with MS on the carry-over effects of six sessions of aquatic physiotherapy. To address this gap in the knowledge, the research completed during this doctoral study explored the perspectives of people with MS on the carry-over effects of aquatic physiotherapy. The findings of this research developed a new conceptual framework: Burrswood Conceptual Framework of Empowerment. The new conceptual framework and its components make a contribution to the expansion of knowledge in the field of Aquatic Physiotherapy and Multiple Sclerosis. The research provided recommendations for aquatic physiotherapy practice and future research.

The information presented in this thesis is organised in twelve chapters. These are 1) Introduction, 2) Background and Context, 3) Literature Reviews, 4) Rationale for Conducting a New Qualitative Research 5) Research Questions, Aim and Objectives, 6) Theoretical Perspectives, 7) Methods, 8) Findings, 9) Grounded Theory Literature Review 10) Discussion, 11) Limitations, 12) Recommendations, 13) Contribution to Knowledge, 14) Conclusion. These chapters are presented in sequence for a clear flow of the research completed during this doctoral study. The Introduction will present an overview of all chapters. It is intended as signposting of the contents of this thesis.

The Background and Context chapter will provide a synopsis of the progressive, degenerative and long-term neurological condition known as Multiple Sclerosis (MS). The first part will present the topics related to MS: epidemiology, pathology, diagnosis, clinical presentation, health-related quality of life, disability, economic impact of MS on the patient and society. These generic topics will be followed by a summary of the current medical and physiotherapy interventions available for MS. The latter section of this chapter will provide an overview of the aquatic physiotherapy and the advantages of aquatic environment in treating problems associated with MS. The chapter also will provide a synopsis of the context of the researcher's collaboration with the aquatic physiotherapy service at the Burrswood Health and Wellbeing Centre. At the end of this chapter, a rationale of further understanding is proposed and the need for conducting a review of the available evidence on the perspectives of people with MS about the carry-over effects of aquatic physiotherapy is explained.

The Literature Review chapter will provide an introduction on the two literature reviews completed during the course of this research. The preliminary literature review will be presented in this chapter and the Grounded Theory Literature review will be presented after the Findings chapter. This chapter will present the search strategy adopted in the preliminary literature review. The search strategy will provide information on the key words used for searching the most relevant online data bases. This chapter will present information on the criteria used to shortlist the relevant research. At the end of the literature search, no qualitative studies were found that explored the perspectives of people with Multiple Sclerosis on the carry-over effects of aquatic physiotherapy. Therefore, data extraction, critical appraisal and data synthesis could not be completed. The literature review explains the need for future research exploring the perspectives of people with Multiple Sclerosis on the carry-over effects of aquatic physiotherapy.

The Rationale for Conducting a New Qualitative Research chapter presents the need for conducting a qualitative research for exploring the perspectives of people with Multiple Sclerosis on the carry-over effects of aquatic physiotherapy. The following chapter states research questions, the aim and objectives of the present research.

The Theoretical Perspectives chapter is organised in three main parts. The first part will present the ontological and epistemological positions that are suitable for answering the

research questions and achieving the aim and objectives of this research. In this section, researcher will examine his own assumptions concerning reality and knowledge. This chapter will present arguments justifying the suitability of Pragmatism as an ontological and epistemological stance for this research. The second part of this chapter will explore different methodological approaches and discuss the rationale for choosing the qualitative research designs for this research. The latter part of this section examines different qualitative research approaches and justifies the suitability of Classic Grounded Theory methodology for answering the research questions and achieving the aim and objectives of this research. The final part will discuss the place of conceptual and theoretical frameworks in the development of this research.

The Methods chapter will present a detailed description of the methods chosen and adopted in this research. It starts with a synopsis of the sampling methods employed and provides a rationale and description of the two types of sampling method employed. Purposive sampling was employed during the initial stages and theoretical sampling during the latter stages of data collection. Those MS patients who completed a programme of six 1-to-1 aquatic physiotherapy sessions at the Burrswood Health and Wellbeing Centre were considered to constitute a suitable sample in this research. The recruitment section of the methods chapter will provide a detailed description of the steps involved in the recruitment process. It will present information on the identification of potential participants, informing them and recruiting them by using a set criterion of inclusion and exclusion. The data collection section will present the two methods employed in this research. The first is the 'letter-to-a-friend'. The second data collection method is one of the most widely used qualitative methods known as semi-structured individual interview. This section of the methods chapter will present detailed steps involved in the implementation of both data collection methods and a rationale for their choice. The data collection methods section will be followed by a detailed account of the methods of data analysis, presenting information on transcription, data organisation and the procedures of Constant Comparative Analysis. The final sections of this chapter will address ethical considerations and the scientific rigour of this research.

The Findings chapter will present the details of the research participants, categories and core-category found in this research. The categories section will present the three categories that are generated from the data. The categories developed in this research are *Realising Potential*, *Positive Attitude*, and *Enabling*. The latter section of the findings

chapter will provide further conceptualisation of the findings which contributes to the development of the core category: *Empowering*. The core category section also presents two theoretical codes: *facilitating and deterring factors*. The findings chapter will present codes, excerpts, and patterns identified in the data that supported the generation of the categories and core category. At the end of the findings chapter, a new conceptual framework is proposed. This framework explains the associations between the three categories and the core category. The findings chapter will present the concept of *Empowerment* as a carry-over benefit for research participants, who completed the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre.

The Grounded Theory literature review chapter presents information about the methodology implemented in completing the second literature review. The findings of the Grounded Theory research identified 'Empowerment' as the core category representing the perspectives of people with MS about the carry-over effects of aquatic physiotherapy. This finding contributed to the origin of this topic of interest. Before presenting the methods implemented in the Grounded Theory literature review, an introduction to the concept of empowerment is presented. This chapter presents Grounded Theory literature review question, inclusion criteria, search strategy, data extraction, data synthesis, results and review findings. The Grounded Theory literature review found 8 categories and 3 synthesised findings using the Meta-Aggregative qualitative systematic review procedures recommended by the Joanna Briggs Institute,

The Discussion chapter will present evaluation, integration and synthesis of the findings with extant literature. The content of the discussion chapter is organised in two sections. The first section will present evaluation of different theoretical frameworks of empowerment and explain the reasons for selecting Zimmerman's Theoretical Framework of Individual Psychological Empowerment for conceptualising the findings of this research. The third section will discuss the concept of empowerment. The second section presents a novel Burrswood Conceptual Framework of Empowerment with its Intrapersonal, Interactional and Behavioural components. The discussion presented in this chapter will evaluate, integrate and synthesise the findings of the current study with the components of Zimmerman's Theoretical Framework of Individual Psychological Empowerment. This discussion will also include the findings of the Grounded Theory literature review. This discussion will expand understanding of the concept of empowerment and the categories found in this research by comparing and linking them

with the Zimmerman's Theory of Individual Psychological Empowerment and other key concepts of MS patient's empowerment found in the Grounded Theory literature review.

The Limitations chapter will present possible limitations of this research and their influence on the interpretation and applicability of the results. Limitations discussed are participation bias, gender distribution, researcher bias, letter-to-a-friend method, recruitment, and not adopting a purist version of Classic Grounded Theory study. The Recommendations chapter is subdivided into two, the first will offer recommendations for aquatic physiotherapy practice, for incorporating the Burrswood Conceptual Framework of Empowerment in regular aquatic physiotherapy service. Recommendations for physiotherapy section also will provide guidance on the measurement, goal setting and follow-ups and group therapy programmes. The second section will present future research recommendations for advancing the level of knowledge and understanding the gaps.

The Contribution to Knowledge chapter will provide information on the contributions of this research to the advancement of knowledge in the fields of aquatic physiotherapy and Multiple Sclerosis. This chapter will present three sections: Identification of gaps in knowledge, Expansion of knowledge and Letter-to-a-friend. The researcher claims that the development of a new Burrswood Conceptual Framework of Empowerment for people with Multiple Sclerosis is a contribution to the knowledge of the aquatic physiotherapy.

The concluding chapter is divided into three sections. The first section appraises the outcomes of this research. This section revisits the aim, objectives and research questions and determines whether they have been achieved in this research. The second section will present a summary of the key findings on *Realising Potential, Positive Attitude, Enablement, Empowerment* and the Burrswood Empowerment Framework. The summary provides an overview of key steps completed during this research with a brief summary of the key findings.

Chapter 2

Background and Context

Chapter 2: Background and Context

The purpose of the Background and Context chapter is to introduce the reader to the relevant background information that will be necessary to understand the context of this research. This chapter has been positioned as one of the initial chapters of this thesis so that the reader is introduced to the relevant topics from the start. The information presented in this chapter is intended to improve the reader's knowledge and understanding of the topics that are pertinent to this research. This chapter is divided into three main sections. The first section presents information on MS, Physiotherapy for this condition and Aquatic Physiotherapy for MS. The introduction to MS presents an overview of the disease with information covering its causes, prevalence, diagnosis, symptoms, economic burden, and the impact of the disease on patients' lives and the status of current services. The role of physiotherapy and aquatic physiotherapy in the management of Multiple Sclerosis is discussed. The second section presents the organisational context of this research, discussing the development of a new aquatic physiotherapy service at the Burrswood Health and Wellbeing Centre. The final section provides a justification for examining the current evidence in the field of aquatic physiotherapy for people living with MS.

2.1 Multiple Sclerosis

Multiple Sclerosis (MS) is a lifelong condition with the possible consequence of long-term disability in most cases. It is one of the most common disorders affecting younger adults. It affects nerve fibres located in the white matter of spinal cord and brain, and the optic nerve fibres of the central nervous system (Longo, et al., 2018). Nerve fibres are essential to conducting nerve impulses, which are the electrical messages that are required for the day-to-day functioning of the human body. In MS, damage to the nerve fibres leads to impaired function of the nervous system.

MS is described as an autoimmune disorder because of its association with abnormal functioning of the immune system (Raffel, Wakerley and Nicholas, 2016). The normal function of the immune system is to protect the human body from external harmful organisms such as infection by attacking and destroying them. However, in case of autoimmune disease the immune system becomes dysfunctional and T cells start

destroying the normal cells of the human body. In MS, the immune system attacks the normal protective covering of the nerve fibres called the myelin sheath. This pathological destruction is commonly called demyelination (Thompson, et al., 2018). The abnormal immunity response results in inflammation and damage to nerve fibres. The stage of demyelination is usually followed by a repair of the nerve fibres with residual scars. This demyelination and repair is known as the active stage of the disease. The scarring leaves hard fibrous residues in the central nervous system that are called 'sclerotic plaque' (Bjartmar, Wujek and Trapp, 2003). Multiple Sclerosis is so called because of the development of these scars in multiple locations of the central nervous system. The demyelination and sclerotic plaque within the nerve fibres result in problems with the conduction of nerve impulses (Compston and Coles, 2008). The impaired functioning of the nerve fibres leads to impaired function of the body.

Multiple Sclerosis (MS) is a progressive condition because the neurological problems gradually become worse with time. It is also a chronic condition because the disease is long-term and life-long. Depending on the stage of the disease, MS is commonly divided into four phenotypes (Raffel, Wakerley and Nicholas, 2016). The first appearance of the focal neurological lesion in the central nervous system is described as the 'clinically isolated syndrome' (Raffel, Wakerley and Nicholas, 2016). As the disease progresses, the episodes of demyelination and repair becomes more apparent. The sequential episodes of the focal neurological dysfunction and recovery are termed relapses and remissions (Raffel, Wakerley and Nicholas, 2016). During this stage, the disease is described as Relapsing and Remitting Multiple Sclerosis (Raffel, Wakerley and Nicholas, 2016). About 90% of patients with MS are diagnosed with this type of MS. Even though relapses can differ in severity, each can result in some form of residual disability. As the disease progresses, relapses become less frequent. At the latter stages of the disease, relapses cease. Despite the absence of relapses, the disability continues to increase. This stage is known as Secondary Progressive Multiple Sclerosis (Raffel, Wakerley and Nicholas, 2016). A small percentage of patients does not have any clear relapse and from the onset they present with a progressive form of disease. The type of MS without any clear-cut relapse and remissions is described as the Primary Progressive Multiple Sclerosis phenotype (Raffel, Wakerley and Nicholas, 2016).

2.1.1 Epidemiology

It is estimated that globally 2.3 million people live with MS (MSIF, 2013). Its incidence is about one per 600 people living in the United Kingdom (UK). According to the Multiple Sclerosis Society there are over 100,000 people currently living with MS in the UK and each year 5000 more new patients are diagnosed with MS in the UK (MSS, 2018). An audit conducted in the UK estimated that there were 126669 people living with MS in 2010 and 6003 new patients were diagnosed with MS that year (Mackenzie, et al., 2014). A review by Koutsouraki, Costa and Baloyannis, (2010) found that the prevalence of MS in Europe has increased in the last decade and there were more people living with MS in 2010 than in the previous decade. This review also found that an increased number of people with MS live with disabilities.

Although the cause of MS is still unknown, there is evidence to link certain risk factors with MS. The genetic risk factors for pathogenesis are linked to human leukocyte antigen genes: HLADR15 and HLADQ6 (Raffel, Wakerley and Nicholas, 2016). MS is more prevalent in the female population which is similar to the incidence of other autoimmune disorders. Women are three times more likely than men to be diagnosed with MS (Raffel, Wakerley and Nicholas, 2016). MS is more prevalent in people of white ethnic than African or Asian background and is more prevalent in the countries far from the equator. Previous episodes of Epstein-Barr virus infection, smoking, vitamin D deficiency, and geographical location are identified as environmental risk factors for MS (Raffel, Wakerley and Nicholas, 2016).

2.1.2 Diagnosis

A diagnosis of MS is normally based on the history of the disease, clinical presentation of the condition, magnetic resonance imaging and subjective and objective examination. The McDonald criteria (2010) are widely used in confirming the diagnosis and are also useful in distinguishing MS from the other neurological conditions that mimic MS in their presentation. According to these criteria, a patient should demonstrate a combination of certain clinical features before a diagnosis of MS can be confirmed. The salient features include recurrent episodes of relapse and the appearance of demyelinated lesions in multiple locations of the central nervous system (Thompson, et al., 2018). These lesions must be identified by the latest investigation equipment such as Magnetic Resonance

Imaging Scans. At the end of 2017, the revised McDonald criteria were proposed by the International Panel on Diagnosis of Multiple Sclerosis which is intended to improve the speed and accuracy of diagnosis (Thompson, et al., 2017). However, the revised criteria are yet to be incorporated in practice.

2.1.3 Clinical Presentation

“No two people living with MS experience it the same way” (MS-UK, 2017).

The clinical presentation of MS can differ vastly in each and every patient. Symptoms of MS are unpredictable, fluctuating and quite different for different people living with this condition (MSIF, 2016). Some symptoms are influenced by external factors and exacerbated. For example, feelings of tiredness can become worse after a period of exposure to hot weather. Patients also experience a wide range of symptoms at different stages of the disease. The symptoms experienced during the stage of acute exacerbation can differ totally from those experienced during periods of disease inactivity. The location of the demyelination within the central nervous system is responsible for a certain type of symptom. For example, demyelination in the Optic nerve is linked to visual dysfunction (Thompson, et al., 2018). The level of disability increases as the disease progresses and reflects the accumulation of residual symptoms (Longo, et al., 2018). The symptoms of MS are described as primary and secondary (NMSS, 2018a). Symptoms that are the direct result of the demyelination and damage to nerve fibres are known as primary; those that develop as a consequence of primary symptoms at a later stage are described as secondary. As the disease progresses the primary symptoms can become worse and some new symptoms may present. Because of the build-up of residual symptoms and disability, patients also develop secondary complications such as contractures, deformities, reduced cardiovascular fitness and decreased functional abilities (NMSS, 2018a).

The primary symptoms of MS can be wide ranging. While it is possible to observe many symptoms in MS, the most commonly seen primary symptoms are fatigue, muscle weakness, spasticity, problems with vision, sensory disturbances, feelings of dizziness, vertigo, poor co-ordination, balance disturbances, walking difficulties, pain, bladder problems, bowel dysfunction, depression, issues with cognitive function, emotional

problems and problems with sexual function (NMSS, 2018a). An audit completed by the Royal College of Physicians in 2011 reported that fatigue and problems with mobility are the most commonly seen symptoms in people with Multiple Sclerosis (RCP, 2011).

Fatigue in Multiple Sclerosis is reported as:

“a patient’s perceived lack of physical or mental energy which may interfere with the performance of normal daily activities” (Berger, et al., 2013, p.1526).

Fatigue in MS is described as an experience of extreme levels of tiredness leading to feelings of exhaustion. It is one of the most debilitating symptoms of MS and found to be correlated with other major problems of MS. Research demonstrated correlation between higher levels of fatigue and physical deconditioning in people with MS (Valet, et al., 2016). In an exploratory study, Burschka, et al. (2012) found that the severity of fatigue is correlated with deterioration of walking speed. Fatigue is also found to be associated with low self-efficacy, depression, fear, worthlessness and low levels of participation in social activities (Warner, 2012). There are two types of Fatigue in MS: Primary and Secondary (Khan, Amatya and Galea, 2014). The former is directly associated with the pathological problems of MS. Appearance of fatigue due to increases in body temperature is a good example of primary fatigue. Secondary fatigue is a consequence of other problems that are not related to MS pathology. Fatigue as a consequence of lack of sleep, cardiovascular deconditioning and side effect of a medication are among examples of secondary fatigue.

As a result of disruption in the transmission of nerve impulses in MS, skeletal muscles can lose their strength and become weak in the long term. Imbalance in the excitatory and inhibitory function of the nervous system can lead to the dysregulation of skeletal muscle tone. Many patients also develop spasticity, which is characterised by abnormal increase in skeletal muscle tone, feeling of stiffness, abnormal posture and exaggerated tendon reflexes (MSIF, 2016). A combination of symptoms such as fatigue, skeletal muscle weakness, spasticity, pain, sensory loss, visual disturbance, poor balance and lack of coordination can cause problems with safe and independent mobility. These problems can range from needing minor support in walking to a complete loss of ability to walk. Some patients may need temporarily to use assistive mobility devices during a

stage of relapse, others may become permanently dependent on walking sticks and wheelchairs.

Sensory problems such as pins and needles, tingling, numbness and visual disturbances such as blurred or double vision are often reported as among the first symptoms of MS (MSIF, 2016). Sensory and visual problems are the initial symptoms that prompt a visit to a General Practitioner for seeking advice and receiving a formal diagnosis of MS at a later date. Some patients may experience a peculiar symptom known as vertigo, which presents with symptoms of loss of balance, feelings of light headedness, vomiting, and spinning of the environment. Bladder and bowel dysfunction in MS can present as urgency for urination, lack of control, frequent urination, incomplete emptying and constipation.

Pain is another commonly reported symptom of MS that can be seen in about two-thirds of MS patients (MST, 2018a). It is suggested that every patient with MS experiences some form of pain at some point during the course of their disease. The type of pain and frequency of its episodes can differ from patient to patient (Foley, et al., 2013). Pain sensations in MS can fluctuate. Although pain may be temporary for some, for others it can be constant. MS related pain commonly takes two forms: neuropathic and nociceptive (Solaro, Trabucco and Uccelli, 2013). While neuropathic pain originates directly from damage to nerve fibres, nociceptive pain is linked to the secondary musculoskeletal problems (Solaro, Trabucco and Uccelli, 2013). Neuropathic pain can appear from the onset of the disease and be present throughout its course. Neuropathic pain can be more prominent during the active inflammatory stages of the disease. The most commonly reported neuropathic pain sensations are burning, shocking and stabbing. Nociceptive pain is more common in the latter stages of the disease and is often chronic. An unusual pain sensation reported by MS patients is known as 'MS Hug', described as a feeling of tightness around the chest (NMSS, 2018b).

People with MS are also affected by a wide range of mental health problems (MSS, 2018). They may experience abnormal changes in mood, emotion, cognition and behaviour. Although emotional, cognitive and behavioural symptoms are rare in MS, depression is one of the most common mental health problems seen in MS (MSS, 2018). People with emotional and behavioural problems may lack control over their emotions and may display inappropriate behaviour. For example, patients may laugh hysterically

in response to sad news; patients may overreact to a minor situation and become unnecessarily aggressive. Cognitive symptoms are exhibited as problems with memory, thinking, planning and concentration (MSS, 2014). It is difficult to pin point a single reason for any specific mental health issue associated with MS, but a combination of several factors is suggested.

2.1.4 Health-related Quality of Life in MS

Health-related quality of life is defined as:

“the physical, psychological, and social domains of health, seen as distinct areas that are influenced by a person’s experiences, beliefs, expectations, and perceptions” (Testa and Simonson, 1996, p.835).

Health-related quality of life is a self-reported measure of an individual’s quality of life that is affected by problems related to their health (Buchanan, Huang and Kaufman, 2010). People with MS reportedly have lower health-related quality of life than healthy and other populations with chronic disease (Berrigan, et al., 2016). Even though there could be many reasons for the decreased levels of health-related quality of life in MS, some of the associations can be linked to the prominent symptoms of MS. Lower health-related quality of life is found to be associated with fatigue, depression, anxiety, increased disability and comorbidities of MS (Berrigan, et al., 2016). People with MS also develop comorbidities such as chronic lung disease, high blood pressure, high cholesterol that are associated with the decreases in the health-related quality of life (Berrigan, et al., 2016).

2.1.5 Disability in MS

The Equality Act 2010 provides that

“A person (P) has a disability if-

(a) P has a physical or mental impairment, and

(b) the impairment has a substantial and long-term adverse effect on P's ability to carry out normal day-to-day activities" (UKPGA, Equality Act, 2010, p.4).

Likewise, under this Act a person who is diagnosed with MS may be considered disabled and eligible for disability benefits. As the disease progresses, substantial long-term disability can accumulate over time (Damasceno, et al., 2013). The majority of MS symptoms limit ability of a person to carry out normal activities of daily living. In addition to the residual symptoms from relapses, during the course of the disease MS patient may also accumulate many secondary complications that increase their disability over time. Patients may also lack ability to participate in meaningful activities and perform work. There are many tools for measuring the disability levels in MS. Expanded Disability Status Scale (EDSS) of Kurtzke is the most commonly used scale for quantifying disability in MS (Meyer-Moock, et al., 2014). EDSS is an ordinal scale with scores ranging from 0 to 10. A score of 0 represents absence of disability and a score of 10 represents death. Kurtzke EDSS scores are also used to classify and measure the severity of disability. On EDSS scores disability ranges from mild, moderate to severe. Patients with scores from 0.5 to 3 on the EDSS scale are regarded as having mild disability; patients with scores from 3.5 to 5.5 as having moderate; from 6 to 9.5 as having severe. EDSS has been criticised for its limited consideration of cognitive and socioeconomic aspects of patients' lives (Gray, et al., 2009). Although EDSS is sensitive for measuring changes in the level of disability in the grades below six, it is not sensitive enough for measuring minor changes in disability levels above six (Gray, et al., 2009). EDSS levels of disability are widely used in research and clinical practice to assess the effectiveness of interventions and for measuring the progression of the disease (Meyer-Moock, et al., 2014).

2.1.6 Economic Impact of MS

Disability in MS often happens in the prime productive years of economic life of a person between the ages of 20 and 40 years. Naci, et al. (2010) reviewed 29 studies across different cultures and countries that looked at the economic burden of MS. They found that the progressive nature of MS increased the economic costs to patients, their families and local health services. An economic study conducted across five major European countries, including the United Kingdom, concluded that there is a correlation between mobility problems seen in MS and its economic burden (Pike, et al., 2012). The health and social care service costs of MS were estimated to be about £2.5 billion per annum

(CSP, 2011). A recently completed large scale cross-sectional observation study by Kobelt, et al. (2017) included data from 16,808 participants with MS from 16 countries of Europe. MS patients work capacity declined as the severity of disability increased. 82% of people with lower level of disability were in employment. The percentage of those working dropped to 8% for the higher levels of disability. Fatigue and cognitive difficulties were reported as most burdensome symptoms associated with employment (Kobelt, et al., 2017).

2.1.7 Current Status of Services for People with MS

“There’s currently no cure for multiple sclerosis (MS), but it’s possible to treat the symptoms with medications and other treatments” (NHS, 2018).

The available epidemiological evidence suggests that the incidence and prevalence of MS in the United Kingdom has been increasing. Mackenzie, et al. (2014) reported that a greater number of people with MS are living longer. The increase in the life expectancy of people with MS has implications for health and social care services. Given the progressive nature of MS and patients’ increased life expectancy, disability levels are expected to increase with time. Therefore, it is important for health and social care professionals and National Health Service policy makers to factor this in planning services for people with MS.

A joint audit completed by the Royal College of Physicians and the Multiple Sclerosis Trust found that fatigue in people with MS was not well managed by the National Health Services of England and Wales (RCP, 2011). The audit report also expressed concern at the high incidence of falls (79%) among MS population. Although the National Audit Office (2011) figures showed improved access to health services, the Royal College of Physicians (RCP, 2011) audit reported that there was no significant improvement in the service provision in 2011 as compared with 2006. The RCP audit also found that the key recommendations made by National Institute of Clinical Excellence (NICE) in 2003 had not been fully implemented. Nor had the quality requirements stipulated by the National Service Frameworks for Long Term conditions in 2003 been fully met and there was no clear plan for achieving them in the near future. A progress review completed by the National Audit Office in 2015 also indicated that the progress at implementing a

personalised care plan for people with long-term neurological conditions in the UK has been poor (NAO, 2015).

There is disparity in the allocation of funds and provision of services for patients under differing degrees of disability (Kobelt, et al., 2017). The mean cost of expenditure for those with lower levels of disability is much lower than the cost of services for people with higher levels of disability. Interestingly, the provision of services for people with lower levels of disability was similar among the 16 countries in Europe (Kobelt, et al., 2017). However, the cost of providing services for people with high levels of disability varied considerably between the countries. Sweden, Denmark and Switzerland had the highest mean total cost for provision of services for people with severe disability. The United Kingdom was 5th country from the bottom of the list. The authors attributed the disparities in the cost of service among the countries to the differences in the provision, prioritisation and, accessibility of health and social care services during the latter stages of disease (Kobelt, et al., 2017).

Although MS is incurable, there is a wide range of treatment approaches available for managing problems related to MS (NHS, 2018). Recently there has been an influx of disease modifying medication capable of slowing down the progress of the disease (Raffel, Wakerley and Nicholas, 2016). Some forms of medication have also been shown potential to prevent or reduce the number of relapses (Raffel, Wakerley and Nicholas, 2016). During the stages of acute exacerbation of the disease, a patient may be required to be admitted to hospital and provided with hospital-based nursing care. However, during the phases of remission, recovery and at the latter stages of the disease such as patients with Secondary Progressive MS can be treated as outpatients or at home.

Because of the complexity and range of symptoms, management of MS requires a holistic service from a range of health care professionals (NICE, 2014). These professionals work as well-coordinated multi-disciplinary teams with the needs of the patient their primary focus. They normally include general practitioners, consultant neurologists, MS specialist nurses, eye specialists, physiotherapists, occupational therapists, speech and language therapists and social workers (MST, 2018b). Depending on the requirement, dieticians, psychologists and continence specialists may also be involved in the management of MS.

Medical treatments are offered in the form of drugs administered as oral medication or intravenous injection. Surgical intervention in treating MS primary symptoms is rare. However, some patients may require surgery for secondary complications at the latter stages of disease. During the stages of relapse, corticosteroids are used to decrease the severity of acute exacerbation (NICE, 2014). There is a wide range of medication available for treating MS symptoms (Raffel, Wakerley and Nicholas, 2016). Drugs used to modulate and regulate immunity can modify the course of the disease in patients with Relapsing and Remitting MS. Interferon beta, teriflunomide, dimethyl fumarate, natalizumab, fingolimod and alemtuzumab are among the commonly used disease-modifying medications (Raffel, Wakerley and Nicholas, 2016). It is believed that these can slow the accumulation of disability in MS. Although there have been many advances in the medical management of Relapsing and Remitting MS, currently there is no medication available for treating the course of Primary Progressive MS (Raffel, Wakerley and Nicholas, 2016). Recently there has been considerable interest among patients and research communities in the effectiveness of stem cell implants. However, the research is inconclusive at this stage and clinical trials are ongoing.

2.1.8 Physiotherapy for MS

“Physiotherapy is a science-based profession and takes a ‘whole person’ approach to health and wellbeing, which includes the patient’s general lifestyle. Physiotherapy helps restore movement and function when someone is affected by injury, illness or disability” (CSP, 2018).

Physiotherapists assess and evaluate impairment, activity limitations and participation restrictions in people with MS. They can provide a range of interventions for managing the complex symptoms of MS (CSP, 2017). Among frequently used physiotherapy techniques are exercise, functional electrical stimulation, body-weight supported treadmill training, inspiratory muscle training and therapeutic standing (Campbell, et al., 2016). Physiotherapists also offer advice on managing and preventing the long-term complications of MS. They have the expertise to design exercise programmes based on the individual’s physical mobility requirements (CSP, 2017).

Upper limb rehabilitation strategies incorporating different interventions have demonstrated improvements in function (Lamers, et al., 2016). Physiotherapy can improve walking parameters. A systematic review completed by Learmonth, Ensari and Motl (2016) found 21 relevant research that investigated the effects of physiotherapy on walking ability of people with MS. Meta-analysis of this review demonstrated significant improvements ($p < 0.05$) in walking measures. Although the available research does not have enough statistical power, most reported positive results.

A survey completed in the UK by Campbell, et al. (2017) collated responses from 1298 adults with progressive MS. The survey found that 87% of participants had access to physiotherapy services indicating a gap in the availability of service to the rest. Some of the identified barriers to accessing physiotherapy services concerned problems of mobility, transport, fatigue, pain and requiring assistance. A high percentage (70%) of research participants found physiotherapy beneficial. The physiotherapy services most commonly used by those with progressive MS are home exercise programmes and individualised exercise sessions with a physiotherapist. However, the survey findings are limited to people with progressive forms of MS.

A qualitative study, completed at the University of Brighton, explored the role of physiotherapists in the management of fatigue in people with MS (Garikipati, et al., 2011). This study found that physiotherapists played an important role in the self-management of fatigue. Participants indicated that physiotherapists adopted a patient-centred approach to the management of fatigue. The advice offered by physiotherapists helped participants in planning functional activities which improved their energy efficiency and decreased effort in performing those activities. Besides these improvements, participants also reported psychological benefits as a result of participating in regular physiotherapy. Participants reported that regular physiotherapy is beneficial in the management of fatigue in MS.

A survey completed in 2016, covering 23 European countries, found that physiotherapists are among the most commonly seen professionals associated with MS rehabilitation (Rasova, et al., 2016). Although the reasons for referral of a patient with MS to physiotherapy can be varied, Rasova, et al. (2016) found that the most frequently reported reasons for physiotherapy referral are a deterioration in symptoms, prevention

of complications, management of acute exacerbation, palliative care, and management of psychological issues. The majority of physiotherapy services available across Europe are offered on an individual basis either in an inpatient or outpatient hospital setting (Rasova, et al., 2016). Although this survey provided an overview of physiotherapy services available to MS patients in Europe, the results do not fully represent the service offered in the United Kingdom because only one UK centre participated in the survey.

Physiotherapy plays an important role in helping people with MS exercise (CSP, 2017). There are some good quality systematic reviews suggesting the benefits of exercise interventions in this population. Exercise has resulted in improvements in mobility, fatigue and quality of life (Edwards and Pilutti, 2017; Heine, et al., 2015; Motl and Gosney, 2008). There is strong evidence to support the role of exercise therapy on the mobility, muscle power, exercise tolerance, and some moderate evidence on the mood (Rietberg, et al., 2005). Exercise interventions have the potential to improve balance and falls (Gunn, et al., 2015; Paltamaa et al., 2012). Exercise therapy has shown improvements on the depressive symptoms in MS (Ensari, Motl and Pilutti, 2014).

The management of problems such as fatigue and falls can decrease the level of disability and improve the health-related quality of life. Enabling people with MS to be physically active improves their quality of life and decreases the economic burden on National Health Services (NHS). Patients who are supported by physiotherapists are more likely to participate in regular exercise (MSS, 2013) and National Institute for Health and Care Excellence guideline recommends supervised exercise programmes for MS patients (NICE, 2014). Although there is adequate evidence to support the use of exercise therapy for mild to moderate disability, the evidence in severe MS is limited. MS patients, who participated in the Royal College of Physician's audit (RCP, 2011) expressed concern at the reductions in the physiotherapy services in the NHS. A survey conducted by the MS Society, UK also demonstrated that there are disparities in the accessibility of physiotherapy services across the UK (MSS, 2013). The below information presented on the MS Trust, UK website provides an overview of the current status of access to physiotherapy

“NHS access to physiotherapy for people with long-term conditions may be limited to six sessions in every two-year period and there are often long waiting lists” (MST, 2018c).

A MS Society survey (2013) found that those living in certain post codes with better income and financial stability are more likely to have easy access to specialist services such as MS specialist nurse, MS specialist physiotherapy. People who are dependent on others for transport and assistance are less likely regularly to attend exercise classes. The National Audit Office expressed concern and indicated that there were no incentives for improving the quality of services to people with long-term neurological conditions (NAO, 2011). This situation is unlikely to improve in the coming years because the NHS has been implementing radical austerity measures to combat growing financial deficits.

2.1.9 Aquatic Physiotherapy

Aquatic physiotherapy is defined as:

“A physiotherapy programme utilising the properties of water, designed by a suitably qualified Physiotherapist. The programme should be specific for an individual to maximise function, which can be physical, physiological, or psychological. Treatments should be carried out by appropriately trained personnel, ideally in a purpose built, and suitably heated Aquatic Physiotherapy Pool” (ATACP 2014).

Because of the hydrodynamic properties of water such as buoyancy, viscosity and hydrostatic pressure, exercise in water can be beneficial in the management of complex problems seen in people with neurological conditions such as MS (Frohman, et al., 2015). Buoyancy is the property of water that exerts upward force on an object placed in the water. It can help to decrease the gravitational force exerted on the body and make it feel less heavy on the feet while submersed in the water (Becker, 2009). The degree of decrease in weight is proportional to the percentage of body immersed in water (Becker, 2009). Buoyancy is helpful in training people who find it difficult to perform day-to-day physical activities such as standing, walking, jogging and running (Grosse, 2009). It can also allow muscle relaxation and decreased weight during immersion allows easy movements (Frohman, et al., 2015). The viscosity or thicknesses and density of water is higher than that of air. While exercising on land, the body parts can be moved easily against air. While exercising against water, body parts receive resistance because of its

viscosity (Frohman, et al., 2015). The resistance offered by water can be used to train strength in selective muscle groups that are essential to function. Exercises in water can be easily adapted to the varying needs of patients and can be used as a rehabilitation intervention for pain relief, improving muscle function, joint range, and cardiovascular fitness (Torres-Ronda and Alcázar, 2014). Pain relief and muscle relaxation from aquatic therapy could be attributed to the activation of the pain gate mechanism of the human body (Bender, et al., 2005). Immersion in water stimulates sensory receptors of pressure and temperature which activate the pain gate mechanism. In addition, aquatic exercise can improve strength and decrease swelling which can further help with relaxation and decrease pain (Bender, et al., 2005).

Aquatic therapy pools can provide a suitable medium for people who have difficulty in exercising on land. The hydrodynamic properties of water and effective use of flotation devices can counterbalance the effects of gravity on the immersed body part. Because of these properties, the risk of injury from a fall can be considerably lower in water than on land. The ground reaction forces exerted on joints while exercising in water are also lower than on land (Torres-Ronda and Alcázar, 2014). This allows patients to participate in a range of progressive weight bearing and movements without worrying about risk of damage to articular surfaces of joints and aggravation of pain.

Relapses in MS result in exacerbation of symptoms. After a severe relapse, patients are not able to participate in day-to-day activities let alone in strenuous exercise. During the remission phase MS patients will benefit from a gradual reintroduction to functional activities and exercises. The hydrodynamic advantages of water make aquatic therapy pools the most suitable medium in which to achieve this gradual reintroduction to weight bearing activities for patients recovering from relapse.

Considering the many advantages of aquatic therapy, it is sensible to recommend it as a suitable intervention for people with MS. Sommer (2011), in an expert review, recommended patient to continue aquatic exercise in a community exercise programme for neurorehabilitation even after their discharge from hospital. However, it must be acknowledged that there are many practical hurdles to delivering exercise in water, unlike that on land. Patients with disabilities require more support in getting in and out of the pool. Some may need help in changing clothes before and after exercise in the pool. More trained professionals are required to help clients during exercise in the pool. Water

in the pools needs to be kept reasonably warm for relaxation to be achieved, and this is expensive. All of the above need more resources from service providers. Although some service users and therapists claim that it is cheaper to run aquatic therapy services as a group session than therapy on the land, there is no evidence providing a cost-benefit analysis to support these claims. The increasing cuts to budget allocation and need for more resources to run aquatic therapy services has resulted in closing down these services more rapidly in recent years. NHS policy makers have been considering the closure of hydrotherapy pools because of the increased pressure on services and decreases in health-care budgets (Campbell, 2013). There have been many newspaper articles in recent years expressing concerns about the closure of hydrotherapy pools in the National Health Services, UK.

2.2 Organisational Context

Provision of ongoing services is part of the fourth and fifth quality requirements recommended by the National Service Framework for Long-Term Conditions (DHSC, 2005). National Institute for Clinical Excellence (2014) guidelines recommends exercise as an important intervention for people with MS. However, currently there is limited provision of on-going exercise services in the National Health Service. To address this gap to some extent the Burrswood Health and Wellbeing Centre has developed a new service for people with MS. It is a private charity hospital based in Kent. This new service has been offering six sessions of aquatic physiotherapy for people with MS. This newly developed service is supported by funds received from different sources. Considering the challenges of fiscal stress associated with the continuation of this new service, managers at the hospital adapted both person-orientated and task-orientated leadership strategies. The transformational leadership approach was used by managers while communicating the need for the evaluation of this new service to patients and therapists. Managers also showed task-orientated leadership in initiating the development of a new audit tool which was required for the evaluation of this new service.

Although there is evidence to show the advantages of exercise to people with MS (see section 2.1.8), there is no evidence either to support or disprove the benefits of six sessions of aquatic physiotherapy. In addition to the financial stress, the lack of evidence provided a rare opportunity for therapists and service providers to evaluate the effects of

this new service at the Burrswood Health and Wellbeing Centre. A small group of professionals with a common interest in aquatic physiotherapy formed as the MS Aqua Research Team (MSART) to explore and evaluate the effects of this new aquatic physiotherapy service. The research team is made up of academics from the University of Brighton and clinicians from the Burrswood Health and Wellbeing Centre. The research team developed a new audit tool called the Burrswood Standardised Data Collection Audit Form (Krouwel, et al., 2014a). This form was incorporated as part of the documentation of services for people with MS. Physiotherapists collected details from the consenting participants on their age, gender, type of MS, employment status and time since diagnosis. The data collection form gathers information on the details of activities and therapies performed in the water. The forms were coded to maintain the anonymity of participants. Physiotherapists also recorded pre and post aquatic physiotherapy scores received from the patient and reported outcome measures on fatigue and health-related quality of life in addition to the objective measures of balance and gait assessed by physiotherapists.

Besides the audit, the research team also gained approval from the University of Brighton's Faculty Research Ethics and Governance Panel and completed several quantitative and qualitative research projects exploring the immediate effects of six sessions of aquatic physiotherapy on fatigue, balance, gait and health-related to quality of life of participants with MS. Although the Burrswood Health and Wellbeing Centre does not have an internal ethics committee, the Centre allowed research activities subject to receipt of an approval from a recognised ethics committee. The research was supported by the Burrswood Centre management who granted access to the researchers to the facilities, resources, patients and their medical records. The Multiple Sclerosis Aqua Research Team research projects and the audit demonstrated benefits of this newly developed service on fatigue, balance, gait and health related quality of life of participants with MS (Krouwel, et al., 2014a; Krouwel, et al., 2014b). However, the projects completed by the MS Aqua Research Team only examined the immediate effects of the intervention and identified the need for future research to understand the perspectives of people with MS about the long-term and carry-over effects.

2.3 Summary of Background and Context

The information presented in this chapter indicates that Multiple Sclerosis (MS) is an auto-immune disease of the central nervous system affecting a large number of people across the globe. MS is a progressive and deteriorating condition. The clinical presentation of MS can be varied and unpredictable. No two people with MS are the same. In the majority of patients diagnosed with MS, disability accumulates as the disease progresses. People with MS report lower levels of health-related quality of life than is the case with other chronic conditions and a healthy population. There have been some positive developments in pharmacological intervention in managing the symptoms of MS. There is, however, no cure for the disease. The complex presentation of MS requires the well-coordinated work of multidisciplinary teams. Physiotherapists are important members of these multidisciplinary teams and play an important role in the management and rehabilitation of people with MS. Physiotherapists have expertise in managing the issues of a wide range of MS symptoms. They provide education and advice on managing the secondary complications of MS. Self-management is an important element in the effective management of progressive long-term neurological conditions. Physiotherapists advise people with MS on suitable self-management strategies. They facilitate and support individuals with MS in the effective implementation of the self-management strategies. The unique properties of water are advantageous to people with MS. Aquatic therapy is a useful intervention in the treatment of MS. There is a need for future research to explore the effects of aquatic physiotherapy intervention to people with MS.

Chapter 3

Literature Reviews

Chapter 3: Literature Reviews

To achieve the purposes of this research, the researcher completed two literature reviews during the course of this doctoral study. These are preliminary and Grounded Theory literature reviews. The preliminary literature review was conducted before the data collection. The Grounded Theory literature review was completed during the final stage of data analysis and after the generation of core category. To avoid repetition, improve chronological flow and better organisation of material in this thesis, the preliminary literature review is presented in this chapter and the Grounded Theory literature review will be presented before the Discussion chapter of this thesis (see Chapter 9). After generation of the research question the researcher evaluated the theoretical perspectives and identified Classic Grounded Theory approach as a suitable methodology for answering the research questions and achieving the aim and objectives of this research. A detailed discussion of Grounded Theory approaches is presented in the Theoretical Perspectives chapter (see Chapter 6).

Although the timing and purpose of literature review in conventional quantitative and qualitative studies is less ambiguous, it is confusing in the nonconventional research approaches such as Grounded Theory. Furthermore, there are differing and conflicting opinions on when to conduct literature review, how many should be completed and the extent to which they should be used in the Grounded Theory research (Giles, King and de Lacey 2013). Because of the prevailing confusion on the use of literature review in Grounded Theory and the choice of Grounded Theory methodology incorporated in the current research, the introductory part of this Chapter will explicate the timing, number and purpose of literature review in the current study and compare them with the conventional research approaches. The researcher hopes this explanation improves the reader's understanding of the role of the literature reviews in the current study and brings coherence between the literature reviews and findings of this doctoral study.

3.1 Timing, Number and Purpose of Literature Reviews

Quantitative studies and conventional qualitative studies have one literature review that is often completed prior to the commencement of the study. This pre-study literature review is commonly known as the preliminary literature review. It is placed at the

beginning of the research process and is always completed before finalising the research question and entering the data collection and analysis stages. While the preliminary literature review is the only kind seen in quantitative and the conventional qualitative studies, depending on the researcher's epistemological position, there could be either one or two literature reviews in Grounded Theory studies.

The most commonly seen Grounded Theory approaches are Classic, Straussian and Charmaz. A detailed discussion of these approaches can be found in the Chapter 6 of this thesis. There are few variations in the Classic Grounded Theory. The positivist version is advocated by Glaser and known as the Glaserian Grounded Theory. The pragmatist version of Classic Grounded Theory has been used in the current research. For the purpose of discussion in this chapter the terms Glaserian, Straussian, Charmaz and Pragmatist Classic Grounded Theory will be used.

There are differing views of the timing, level of depth, and place of literature review in the Grounded Theory research. Although there is consensus among scholars about the use of existing literature and conducting literature review for a Grounded Theory study, there are vigorous debates and disagreements about the suitable timing of it (Dunne, 2011). The disagreement among scholars about the timing of literature review, whether it should happen prior to data collection or after data collection, is compared with the popular metaphor 'which one comes first: the chicken or the egg?' (Dunne, 2011, p.113). The disagreements and debates among scholars have resulted in a conundrum among Grounded Theory researchers about the positioning of literature review in their studies (El Hussein, Kennedy and Oliver, 2017).

Table 1 presents a comparison of the timing and number of literature reviews of this doctoral study with other research approaches. Despite the differences in the opinions of Grounded Theory researchers on the number, timing and purpose of literature review, they all agree and recommend a new literature review during the iterative data collection and analysis stages of the research. The iterative data collection and analysis process is popularly known as the 'Constant Comparative Analysis'. Conducting a separate literature review during the Constant Comparative Analysis stage is one of the distinguishing characteristics of the Grounded Theory research approach. Because of its distinctive positioning and exclusive association with Grounded Theory research this literature review is commonly referred as the 'Grounded Theory literature review'.

Research Approaches	Literature review before the data collection and analysis.	Literature review during the stages of data collection and analysis	Number of literature reviews
Quantitative and conventional qualitative studies	Yes (Preliminary literature review)	No	1
Glaserian Grounded Theory approach	No	Yes (Grounded Theory literature review)	1
Straussian and Charmaz Grounded Theory approaches	Yes (Preliminary literature review)	Yes (Grounded Theory literature review)	2
Pragmatist Classic Grounded Theory approach (implemented in the current Doctoral study)	Yes (Preliminary literature review)	Yes (Grounded Theory literature review)	2

Table 1: Comparison of the timing and number of literature reviews of this doctoral study with other research approaches

The Glaserian Grounded Theory approach does not support a preliminary literature review. Followers of traditional Glaserian Grounded Theory approach argue that the preliminary literature review conducted in the topic area makes researchers too familiar with existing knowledge on the topic. According to Glaserian Grounded Theory researchers, this familiarity will lead to preconceived knowledge that jeopardises the creative exploration of topics from new perspectives. Traditional GT researchers also fear that the concepts identified in the preliminary literature review force their way into the data and thus contaminate, inhibit and constrain the emerging theory (Giles, King and de Lacey 2013). Therefore, they do not recommend a literature review before the data collection and analysis. The Glaserian Grounded Theory approach advocates completion of a Grounded Theory literature review during the Constant Comparative Analysis. As mentioned earlier in this chapter, the iterative data collection and analysis steps that are uniquely seen in the Grounded Theory studies are known as 'Constant Comparative Analysis'. Glaserian Grounded Theory researchers believe that delaying literature review until the 'Constant Comparative Analysis' stage will avoid the influence of the prior literature on the emergence of the new theoretical codes and categories. Because of this late timing of the literature review in Glaserian Ground Theory study its Grounded Theory literature review is also commonly referred to as the 'Delayed' literature review.

Unlike the traditional Glaserian Grounded Theory approach, more recently developed approaches such as Straussian, Charmaz and Pragmatist Classic Grounded Theory approaches are less rigid and accept the completion of a preliminary literature review. Hereafter, these recently evolved approaches will be referred as non-traditional Grounded Theory approaches. The non-traditional Grounded Theory approaches have two literature reviews: a preliminary literature review and also a Grounded Theory literature review (see Table 1). The researcher following a non-traditional approach believes that it is possible to avoid the risk of influence of prior literature and researcher bias by using reflexivity (Giles, King and de Lacey 2013). The preliminary literature review of a non-traditional Grounded Theory study takes place at the start of the research process, which is similar to practice in conventional quantitative and qualitative studies.

There are multiple uses of a preliminary literature review in the non-traditional Grounded Theory research (Giles, King and de Lacey 2013). It is useful for systematically identifying relevant research, consolidating and summarising prior research on the topic. Preliminary literature review helps researchers in becoming familiar with the knowledge in the area and identifying gaps and inconsistencies in the previous research (Polit and

Beck, 2006). Gaps and inconsistencies are useful for justifying the need for future research and developing new research questions. Preliminary literature review helps researcher in identifying a theoretical framework. If there are no existing theoretical frameworks on the topic, researcher develops a conceptual framework based on the concepts identified in the literature review. All the preceding procedures are required for satisfying the requirements of the ethics committees. In majority of the conventional qualitative studies and non-traditional Grounded Theory research the preliminary literature review helps researcher to develop critical knowledge of the key concepts and develop interview questions based on the concepts identified in the literature review. The role of preliminary literature review in this doctoral study is mostly similar to the points presented in this paragraph however it could not be used for developing key concepts and interview questions. Further information about this could be found in the section 3.2.

In addition to the preliminary literature review non-traditional Grounded Theory studies also have a secondary literature review that is completed during the Constant Comparative Analysis stage of the Grounded Theory study. The position of the Grounded Theory literature review in the Straussian, Charmaz and Pragmatist Classic Grounded Theory approaches is similar to that of the Glaserian Grounded Theory approach (see Table 1). The role of literature within the Grounded Theory methodology is different to traditional research (Andrews, 2006). Literature within Grounded Theory research is integrated and synthesised as additional data.

Although they are not explicitly cited in the literature, there appear to be two variants of Grounded Theory literature reviews in Grounded Theory studies. Some researchers further delay the Grounded Theory literature review until the later stages of the 'Constant Comparative Analysis' and wait for the emergence of the theoretical codes and core category before commencing the literature review (Giles, King and de Lacey 2013). Because of their position relative to the emergence of core category these may be differentiated as pre and post core category Grounded Theory literature reviews. As their name implies, pre core category literature review is conducted before the emergence of the core category from the Constant Comparative Data analysis process and post core category Grounded Theory literature review is conducted after. Table 2 presents a comparison of the positioning of the Grounded Theory literature review of this doctoral study with other Grounded Theory approaches. Straussian and Charmaz Grounded Theory approaches conduct the Grounded Theory literature review as an ongoing process throughout the Constant Comparative Analysis. These approaches conduct literature reviews before and after the emergence of core category. Glaserian

approach waits for the emergence of the core category before commencing the Grounded Theory literature review. This doctoral study also completed Grounded Theory literature review after the emergence of the core category. The role of Grounded Theory literature review in this doctoral study is similar to other Grounded Theory approaches. It was used to identify the concepts that are fit and relevant to the core category identified in this Grounded Theory study. It was used to critically appraise the evidence and then integrate, link and discuss the review findings with the core category found in this research.

The Grounded Theory Literature Review in this doctoral study was completed after the emergence of the core category from the findings of this research. Therefore, this review is positioned after the findings chapter of this thesis. To maintain the chronological order of the events completed during the Grounded Theory methodology of this doctoral research and to maintain a logical flow of events, the Ground Theory Literature Review is presented after the findings chapter of this thesis. Please see chapter 9.

Grounded Theory approach	Literature review before the emergence of core category	Literature review after the emergence of core category
Glaserian Grounded Theory approach	No	Post core category Grounded Theory literature review
Straussian and Charmaz Grounded Theory approaches	Pre core category Grounded Theory literature review	Post core category Grounded Theory literature review
Pragmatist Classic Grounded Theory approach (implemented in the current Doctoral study)	No	Post core category Grounded Theory literature review

Table 2: Comparison of the timing of the Grounded Theory literature review of this doctoral study with other Grounded Theory approaches.

3.2 Preliminary Literature Review

3.2.1 The Topic of Interest

The focus of this preliminary literature review will be the perspective of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. For the purpose of this doctoral study 'carry-over effects' are described as

“the effects of aquatic physiotherapy that are retained one month after the cessation of aquatic physiotherapy”.

Carry-over effects versus long-term effects

Even though there is scope for this doctoral research to explore the long-term effects or carry-over effects of aquatic physiotherapy, the researcher chose to use the term carry-over effects for the following reasons. While the word “long-term” is commonly used in health care, the literature is fraught with inconsistencies on what duration constitutes as “long-term”. There are ambiguities about the usage of “long-term” within physiotherapy profession and Multiple Sclerosis research. The timelines used to describe 'long-term' in the research studies seems to be very subjective and the researcher could not find a formal consensus within the available evidence. Some research studies used 12 months post intervention as 'long-term'. Although this timeline seems reasonable, it is impractical to differentiate the effects of an intervention from the effects of other variables that happened during the past 12 months. Subsequently, exploring the long-term effects after a specific timepoint will not be able to suggest whether the effects were due to aquatic physiotherapy or other common variables such as medication and disease progression. On the contrary, carry-over effects are described as

"the effects which occur when an experimental treatment continues to affect a participant long after the treatment is administered" (Lewis-Beck, et al., 2004).

"a carryover effect occurs when an initial treatment 'carries over' to influence a subject's response to a secondary treatment" (O'Connor et al., 2014 p.3).

Unlike long-term effects, the description of carry-over effects seems to focus the attention of researchers, participants and service providers on the intervention and encourages them to differentiate the carry-over effects of aquatic physiotherapy from other common variables. For the reasons discussed so far, the proposed doctoral study will look at the 'carry-over' effects of six sessions of aquatic physiotherapy for people with Multiple Sclerosis.

3.2.2 Origin of the Topic of interest

Between 2010-2019 the Burrswood Health and Wellbeing Centre in Kent offered an aquatic physiotherapy programme for MS patients. The number of therapy sessions offered by the Burrswood Centre was similar to the six sessions commonly offered by the NHS, UK (Bryant, et al., 2009; MST2018c). To determine the effects of this new programme a group of researchers from the University of Brighton and clinicians from the Burrswood Health and Wellbeing Centre in 2010 formed the Multiple Sclerosis Aqua Research Team (MSART). The researcher of this doctoral study was one of the active members of this team.

The MSART completed an audit of 100 MS patients' data using commonly reported outcome measures (Krouwel, et al., 2014 a, b). The audit findings reported the immediate effects and suggested benefits of six sessions of 1-to-1 aquatic physiotherapy on the fatigue, balance, gait and health-related quality of life measures of a large percentage of MS patients. Furthermore, an observational pre- and post- intervention study conducted by the researcher demonstrated significant benefits ($p < 0.005$) of six 1-to-1 aquatic physiotherapy sessions on the fatigue levels and health-related quality of life of MS patients (Garikipati, et al., 2015). In addition to these quantitative studies, a few qualitative research studies were completed by pre-registration physiotherapy students at the University of Brighton as part of MSART projects. These studies found positive benefits of six sessions of aquatic physiotherapy offered by the Burrswood Health and Wellbeing Centre. The researcher also contributed to the analysis of some of these qualitative studies.

The Burrswood audit and Garikipati, et al's (2015) studies were part of several MS Aqua research projects completed by the Multiple Sclerosis Aqua Research Team (MSART).

MSART did not pursue publication of their findings in the peer-reviewed journals, which limited their use in this thesis.

All of the Multiple Sclerosis Aqua Research Team studies only examined the immediate effects of the aquatic physiotherapy programme. None of these explored the perspective of people with MS on the long-term or carry-over effects. Although the small-scale qualitative student projects did not explicitly explore the perspective of people with MS on the long-term or carry-over effects of aquatic physiotherapy, their findings suggested that there is a possibility of gaining carry-over effects. The association of the researcher with the MSART and direct involvement in the qualitative analysis of the previous projects provided researcher insight into the perspective of people with MS on the possibility of carry-over effects. This stimulated the curiosity of the researcher in this topic.

3.2.3 Description of the Intervention

Aquatic physiotherapy is defined as:

“A physiotherapy programme utilising the properties of water, designed by a suitably qualified Physiotherapist. The programme should be specific for an individual to maximise function, which can be physical, physiological, or psychological. Treatments should be carried out by appropriately trained personnel, ideally in a purpose built, and suitably heated Aquatic Physiotherapy Pool” (ATACP 2014).

3.2.4 How the Intervention Might Work?

Because of the hydrodynamic properties of water such as buoyancy, viscosity and hydrostatic pressure, exercise in water can be beneficial in the management of complex problems seen in people with neurological conditions such as Multiple Sclerosis (Frohman, et., 2015). Buoyancy is the property of water that exerts upward force on an object placed in the water. It can help to decrease the gravitational force exerted on the body and make it feel less heavy on the feet while submersed in the water (Becker, 2009). The degree of decrease in weight is proportional to the percentage of body immersed in water (Becker, 2009). Buoyancy is helpful in training people who finds it

difficult to perform day-to-day physical activities such as standing, walking, jogging and running (Grosse, 2009). It can also allow muscle relaxation and decreased weight during immersion allows easy movements (Frohman, et al., 2015). The viscosity or thicknesses and density of water is higher than that of air. While exercising on land, the body parts can be moved easily against air. While exercising against water, body parts receive resistance because of its viscosity (Frohman, et al., 2015). The resistance offered by water can be used to train strength in selective muscle groups that are essential to function. Exercises in water can be easily adapted to the varying needs of patients and can be used as a rehabilitation intervention for pain relief, improving muscle function, joint range, and cardiovascular fitness (Torres-Ronda and Alcázar, 2014). Pain relief and muscle relaxation from aquatic physiotherapy could be attributed to the activation of the pain gate mechanism of the human body (Bender, et al., 2005). Immersion in water stimulates sensory receptors of pressure and temperature which activate the pain gate mechanism. In addition, aquatic exercise can improve strength and decrease swelling which can further help with relaxation and decrease pain (Bender, et al., 2005).

Aquatic physiotherapy pools can provide a suitable medium for people who have difficulty in exercising on land. The hydrodynamic properties of water and effective use of flotation devices can counterbalance the effects of gravity on the immersed body part. Because of these properties, the risk of injury from a fall can be considerably lower in water than on land. The ground reaction forces exerted on joints while exercising in water are also lower than on land (Torres-Ronda and Alcázar, 2014). This allows patients to participate in a range of progressive weight bearing and movements without worrying about risk of damage to articular surfaces of joints and aggravation of pain.

Relapses in Multiple Sclerosis result in exacerbation of symptoms. After a severe relapse, patients are not able to participate in day-to-day activities let alone in strenuous exercise. During the remission phase MS patients will benefit from a gradual reintroduction to functional activities and exercises. The hydrodynamic advantages of water make aquatic physiotherapy pools the most suitable medium in which to achieve this gradual reintroduction to weight bearing activities for patients recovering from relapse. Considering the many advantages of aquatic physiotherapy, it is sensible to recommend it as a suitable intervention for people with MS. Sommer (2011), in an expert review, recommended patients to continue aquatic exercise in a community exercise programme for neurorehabilitation even after their discharge from hospital.

There are four quantitative studies that recorded follow-up measurements of the effects of aquatic intervention on people with MS (Broach, et al., 1997; Broach and Dattilo, 2001; Broach and Dattilo, 2003; Castro-Sanchez, et al., 2012). Although the suitability of Broach and colleagues' intervention to the UK service is limited, there is an interesting point that requires further discussion. All of these studies reported maintenance of benefits at the end of the follow-up phases (1997 study 4 week follow-up, 2001 & 2003 studies: 8 week follow-up). Castro-Sanchez, et al's (2012) study also conducted follow-ups and repeated measurements at four weeks and 10 weeks after completion of the 20-week intervention. Although the lengthy intervention (40 sessions in 20 weeks) offered by Castro-Sanchez, et al's (2012) study is not applicable to current physiotherapy practice and provision in the UK, this study demonstrated carry-over benefits in pain, physical fatigue and health-related quality of life.

There is some evidence to indicate that there may be psychological, social and leisure benefits of aquatic therapy to MS patients. A survey found improvements in the life satisfaction, endurance, mood, physical feeling and muscle tone of MS patients (Veenstra, Brasile and Stewart, 2002). A single-subject design study also found benefits in attention, enjoyment and satisfaction with aquatic therapy (Broach, Dattilo and McKenney, 2007). Although the validity of the questionnaires used in these studies is limited, their findings suggested that the benefits of aquatic therapy are wide-ranging and go beyond the physical effects. A recent review also suggested that aquatic therapy is enjoyable and provides leisure benefits to MS patients (Kensinger, et al., 2017). The findings of the preceding quantitative studies suggest that there is potential for carry-over benefits of aquatic therapy.

3.3.5 Why it is important to conduct this preliminary literature review?

Aquatic physiotherapy in a hydrotherapy pool is an expensive treatment option compared to land based interventions. It must be acknowledged that there are many practical hurdles to delivering exercise in water, unlike that on land. Performing exercises in a pool requires more preparation time and in some cases more professionals are required to assist clients with complex needs. Patients with disabilities require more support in getting in and out of the pool. Some may need help in changing clothes before and after

exercise in the pool. More trained professionals are required to help clients during exercise in the pool. Water in the pools needs to be kept reasonably warm for relaxation to be achieved, and this is expensive. All of the above need more resources from service providers.

Although some service users and therapists claim that it is cheaper to run aquatic physiotherapy services as a group session than therapy on the land, there is no evidence providing a cost-benefit analysis to support these claims. The increasing cuts to budget allocation and need for more resources to run aquatic physiotherapy services has resulted in closing down these services more rapidly in recent years. NHS policy makers have been considering the closure of hydrotherapy pools because of the increased pressure on services and decreases in health-care budgets (Campbell, 2013).

In the recent years, there have been many news headlines expressing concerns about the closure of hydrotherapy pools in the National Health Services, UK (BBC, 2011; Getreading, 2017; Guardian, 2017; The Herts, 2014; The Herald, 2015). Due to the increased stretch on the services and decreases in budgets, NHS policy makers are closing the hydrotherapy pools. The below information posted on The Royal Berkshire NHS Foundation Trust website provides a summary of this situation.

“The Royal Berkshire NHS Foundation Trust will close the Hydrotherapy Pool at the Royal Berkshire Hospital with effect from 31 March 2017. Hydrotherapy suite maintenance costs are high, with higher annual running costs than income. On top of that, the facility needs to be closed and £50,000 worth of investment made, just to keep the pool operative. To keep the facility up and running, we would have to take the funds out of front line acute services, or cut other planned capital works and so, the decision to close the pool was made” (The Royal Berkshire NHS Foundation Trust, 2016).

Although aquatic physiotherapy is considered to be a safe modality for people with MS, several quantitative research studies have reported that a large number of participants withdrew from their aquatic exercise programmes (Bayraktar, et al., 2013; Gehlsen, Grigsby and Winant, 1984; Ghaffari, et al., 2017; Kargarfard, et al., 2012; Rafeeyan, et al., 2010; Roehrs and Karst, 2004). The drop-out numbers provide valuable information on the suitability of aquatic physiotherapy to MS patients. Some researchers reported participant dropout due to exacerbation of MS symptoms. This suggests that there is a

possibility of adverse effects of aquatic exercise. Furthermore, the Multiple Sclerosis Aqua Research Team audit also found that some patients did not benefit from aquatic physiotherapy (Krouwel, et al., 2014 a). Although the majority of MS patients responded positively to aquatic physiotherapy, there were some who either did not respond or deteriorated in their fatigue, health-related quality of life, balance and gait measures. It is important to understand the possible carry-over of adverse effects of aquatic physiotherapy from the perspective of people with MS and their impact on their lives.

Experience and perspectives of people cannot always be counted. Measuring these aspects certainly becomes more complicated while gaining insights into the diverse meaning attributed by people living with long-term conditions such as MS (Hammarberg, Kirkman, and de Lacey 2016). Qualitative research helps researchers to understand the perspective of people and answer 'what' and 'how' questions. It also helps researchers understand the process associated with 'what' and 'how' questions by exploring experiences of people (Silverman 2017). Qualitative research most often collects data in the natural setting where participants experienced the problem or intervention under study (Creswell and Creswell, 2018).

Qualitative research gives voice to the participants and explores the phenomenon from the perspective of the insider (Lapan, Quartaroli and Reimer, 2012). Qualitative research recognises different perspectives (Flick, 2018). It focuses on words and texts as opposed to numbers (Hesse-Biber and Leavy, 2011). It emphasises on exploring the meaning from the perspective of participants and tries to limit the influence of the researcher during the knowledge production through reflexivity (Flick, 2018). Qualitative research presents the holistic account of the topic under study. It discovers the central phenomenon and explains the complex multiple perspectives and factors that may have influence on it (Creswell and Creswell, 2018). Therefore, it is useful to conduct a preliminary literature review for the available qualitative evidence on the carry-over effects of aquatic physiotherapy and understand the perspective of people with MS. This will help us to identify gaps in the knowledge on the carry-over effects of aquatic physiotherapy and propose directions for future research. An initial search for a review on this topic was conducted using the databases PROSPERO (International prospective register of systematic reviews in health and social care), Cochrane Database of Systematic Reviews (CDSR) and JBI Database of Systematic Reviews and Implementation Reports. This search did not find any reviews on this topic. Therefore, the following Preliminary Literature Review question is developed.

3.2.6 Preliminary Literature Review Question

What are the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy?

To answer these review questions, the following objectives were set for the preliminary literature review:

- To identify qualitative research on the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy.
- To critically appraise the research and produce synthesised findings using Joana Briggs Institute Meta-Aggregation analysis.
- To identify gaps in the qualitative evidence the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy and develop a research question that is most suitable to conducting research.

Keywords: Aquatic Physiotherapy, Carry-over effects, Multiple Sclerosis.

3.2.7 Inclusion Criteria

Types of participants

Participants of the research should be people with Multiple Sclerosis. The inclusion is open to any type of MS. There are no restrictions for gender, level of disability and duration of MS. But the minimum age of participants should be 18 years.

Intervention

Any form of aquatic therapy intervention offered by trained professionals. Not just limiting to aquatic therapy offered by physiotherapist. Aquatic intervention could include any form of exercise therapy offered in the water environment. There are no restrictions

on the dosage of intervention, for e.g. total number of sessions, frequency of sessions and total duration of each session.

Phenomenon of interest

Perspective of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy.

Context

Settings of the delivery of aquatic therapy could be hospital, inpatient, outpatient, community, leisure centre.

Types of studies considered

The review considered studies that collected some form of qualitative data. The review did not limit the qualitative studies on their methodological affiliation to any particular approach. Review was open to wide range of approaches such as Phenomenology, Grounded Theory and Feminist research. Mixed-methods studies were considered as long as there is a clear distinction between the qualitative and quantitative data and data extraction for qualitative component is possible.

Exclusion criteria

- Studies that were not published in English.
- Intervention that used a combination of alternative therapies other than exercise.
- Expert opinions and research that were not published in peer reviewed journals

3.2.8 Search Strategy

Literature on aquatic therapy comes from wide range of fields such as Complementary Therapy, Physiotherapy and Sports Science. It was important that the literature search approach used in this study be wide-ranging, transparent and systematic to ensure that

it is repeatable, navigates through diverse fields, and narrows down the scientific literature directly relevant to the focus of this review.

The literature search was not restricted to any historical time line. Online searches were completed on four occasions (February 2013, April 2016, February 2017 and April 2018) during this doctoral study to keep up-to-date with recent developments in the field of aquatic therapy and Multiple Sclerosis. A revised search with a refined focus on the 'carry-over effects' was completed in May and was repeated in November 2019 to check for any updates.

At the beginning stages of this doctoral study the researcher used a variety of alternative terms of "aquatic therapy" while searching for relevant literature in the field. For instance, during the development of the research proposal synonyms such as 'water therapy' and 'aquatics' were also included in the search terms. As the study progressed, the researcher became more familiar with the common terminology used in this field. This helped to develop relevant key words that are appropriate to the carry-over effects of aquatic therapy on MS. To standardise the online search strategy, a set of key words pertinent to the focus of this literature review was identified.

The key words used in completing the online searches were: 'multiple sclerosis and aquatic therapy'; 'multiple sclerosis and aquatic'; 'multiple sclerosis and aquatic rehabilitation'; 'multiple sclerosis and aquatic exercise'; 'multiple sclerosis and hydrotherapy'; 'multiple sclerosis and aquatic physiotherapy'. The refined search for the carry-over effects were completed by using the additional key words: 'carry-over effects'; 'long-term effects'; 'follow up effects'.

Information Sources

The online search for literature was completed by using the following internet databases:

- AMED - The Allied and Complementary Medicine Database
- APA PsycNET (PsychINFO) - American Psychological Association database
- CINAHL Plus - Cumulative Index to Nursing and Allied Health Literature
- Cochrane Central Register of Controlled Trials CENTRAL
- PEDro - Physiotherapy Evidence Database
- PubMed - United States National Library of Medicine
- SPORTDiscus

Study Selection

Initial search results were screened for relevant literature by going through their titles and abstracts using the inclusion and exclusion criteria. Results were classified in two broad categories: relevant research, and irrelevant material. After excluding the latter, the full text of each relevant item was read and reread.

EndnoteTM software (version X8) by Clarivate Analytics (previously Thomson Reuters) was used in sorting the search results, removing duplicates, organising and saving references. The full text articles electronic files were attached to the endnote reference library.

Potentially relevant studies were retrieved in full and their citation details imported into the Joanna Briggs Institute System for the Unified Management, Assessment and Review of Information (JBI SUMARI) (Joanna Briggs Institute, Adelaide, Australia).

The articles that were not accessible in full text by using University databases were ordered by using the inter library loan request facility available at the researcher's place of work and study libraries. Additional hand search for articles was conducted by going through the reference lists included in publications. A detailed search strategy with the results is presented in by using an adapted version of Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flow diagram (Diagram 1).

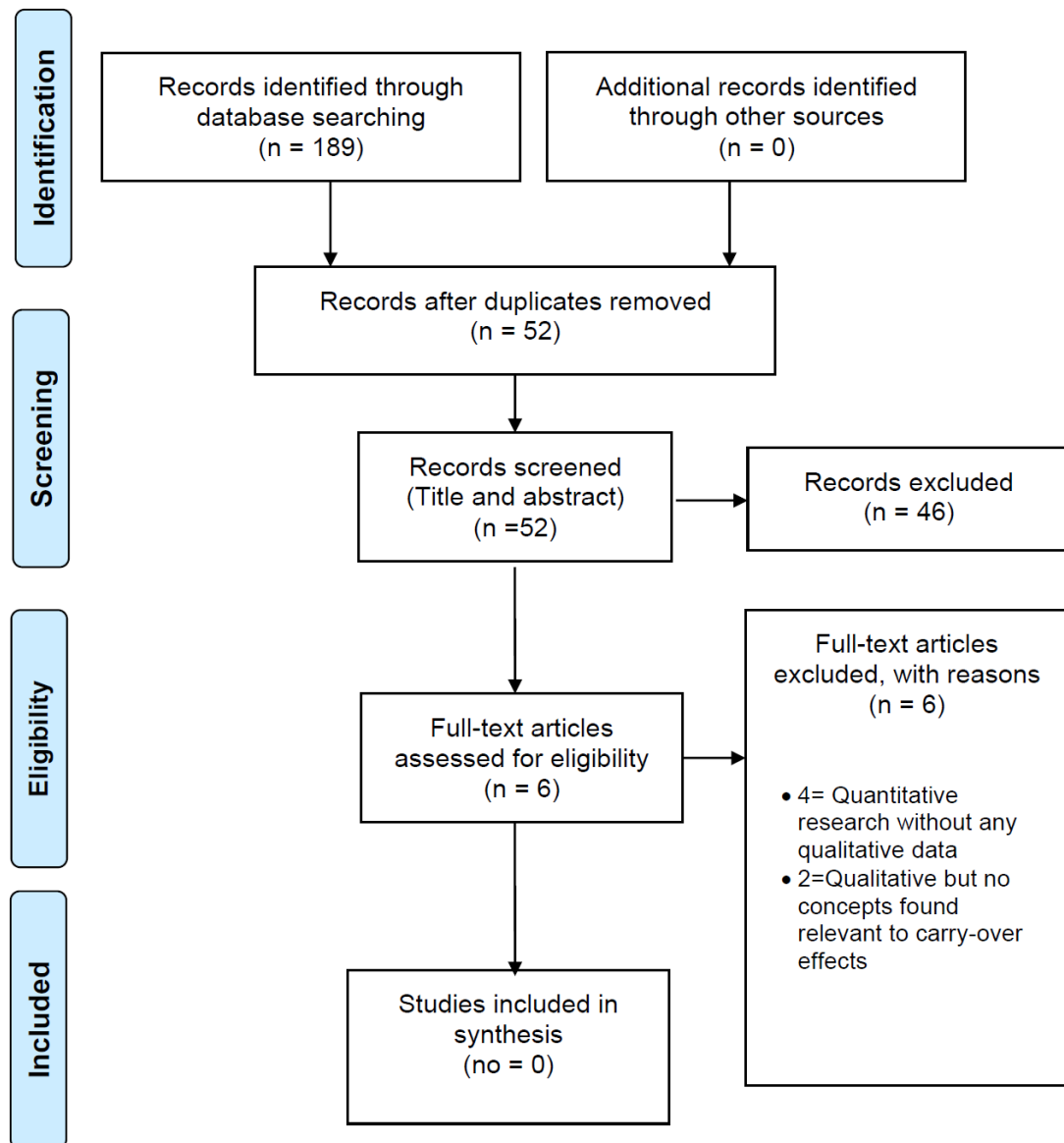


Figure 1: PRISMA flowchart for Preliminary Literature Review

Adapted from: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

3.2.9 Assessment of Methodological Quality

Researcher intended to evaluate the methodological quality of the qualitative studies by using the standard Joanna Briggs Institute Critical Appraisal Checklist for Qualitative research (Lockwood, et al., 2017). However, critical appraisal could not be completed because the literature search did not find any qualitative (or mixed-methods) studies that investigated the perspective of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy.

3.2.10 Results of the Preliminary Literature Review

Following the initial database screening, 189 records were identified. No additional sources were searched. Screening of the reference list of the identified studies found 21 additional records and these were included. 137 records were identified as duplicates and therefore removed from screening. Titles and abstracts were screened to decide the eligibility of 52 records for further screening. On the exclusion criteria 48 records were excluded. After this screening 4 references were found to be eligible for further screening. These 4 full text articles were read for suitability for inclusion. Following this process, none of these articles were found suitable hence all of these articles were excluded. The search results and the reasons for exclusion are mentioned in the adapted PRISMA flow chart (Figure 1). At the end of the literature search, no qualitative studies were found that explored the perspectives of people with Multiple Sclerosis on the carry-over effects of aquatic physiotherapy. Therefore, data extraction, critical appraisal and data synthesis could not be completed.

3.2.11 Summary

The preliminary literature review did not find any qualitative research on the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. Hence a discussion of the findings could not be presented after the review. Results of the preliminary literature review demonstrated that there is lack of research on the perspective of people with MS about the carry-over effects of aquatic physiotherapy.

Lack of qualitative research means there is lack of representation of voice of people with MS. There is no understanding of the carry-over effects of aquatic physiotherapy from the perspective of the insider. Lack of holistic account of the perspective of people with Multiple Sclerosis on the carry-over effects of aquatic physiotherapy means lack of explanation of complex multiple perspectives and the factors that may have influence on it.

Aquatic physiotherapy is an expensive intervention. The current economic climate putting our policy makers in a difficult position and service providers are being asked to consider less expensive and most efficient treatment options. Recent cut downs in the number of staff levels are also making us to explore more efficient methods of delivering better health care for patients. The success of an intervention is judged by its immediate benefits and also their retention. Therefore, it is pertinent to explore perspectives of people with MS and understand the carry-over effects of aquatic physiotherapy. If the new qualitative research finds a programme of aquatic physiotherapy sessions have carry-over effects, and the benefits achieved by these sessions are retained after the cessation of programme then we will not only find an effective treatment for people with MS but also have enough evidence to argue the case for continued provision of aquatic physiotherapy service. Further justification explaining the need for conducting a new qualitative research on this topic is presented in the following chapter (see Chapter 4).

Chapter 4

Rationale for Conducting A New Qualitative Research

Chapter 4: Rationale for Conducting a New Qualitative Research

Preliminary literature review did not identify any qualitative study that explored the perspective of people with MS about the carry-over effects of aquatic physiotherapy. There is a lack of knowledge of perspectives of people with MS about 'what' these carry-over effects are, 'how' they affect their lives and the processes associated with these. Because qualitative research methods are useful in exploring the areas where there is limited research (Hammarberg, Kirkman, and de Lacey, 2016), they are suitable to addressing 'what and how' questions and expanding the knowledge base of the carry-over effects of aquatic physiotherapy for people with MS. The following section will provide justification for conducting qualitative research in exploring this topic.

Lack of qualitative research on the carry-over effects of six sessions of aquatic physiotherapy on people with MS leaves a considerable gap in our understanding of people's experience and their perceptions of those carry-over effects. Qualitative research is the most suitable approach to listening to participants' views and gaining a better understanding of their perspective. It encourages participants to share their subjective experience. Qualitative research allows the researcher to capture the 'Meaning' from wide range of perspectives and different viewpoints (Flick, 2018). Qualitative research provides tools for gathering information and presents opportunities for participants to reflect on their experience (Hammarberg, Kirkman, and de Lacey, 2016). Qualitative research will be necessary to explore, expand knowledge and provide new insights on the areas where there is limited knowledge (Creswell and Creswell, 2018). Considering lack of qualitative research on the perspective of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy, it is a suitable research problem for conducting a new qualitative research.

Lack of prior research and working definitions of the carry-over effects of aquatic physiotherapy for people with MS limits us in defining variables and designing quantitative studies. Knowledge on the topic should be adequate for designing quantitative studies that measure and test the hypothesis on the causes, effects and relationships between variables (Flick, 2018). Because there is no prior qualitative research on the perspective of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy, it is not possible effectively to isolate variables and analyse the

effects. Available knowledge on this topic is too limited to generate meaningful hypotheses. While the 'why' questions are best answered by quantitative studies, to design quantitative research it is important for researchers to understand 'what' and 'how' questions first (Silverman, 2017).

Lack of theoretical models and gaps in knowledge of carry-over effects of aquatic physiotherapy necessitates exploration and discovery of new concepts grounded in the participants views (Flick, 2018). The data gained from qualitative research provides the starting point for future empirical studies (Flick, 2018). Therefore it is useful to design a qualitative study exploring the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. The findings of this qualitative study help us to answer the 'what' and 'how' questions as the starting point.

While quantitative studies are useful in testing the hypothesis on the predetermined variables, qualitative research has the potential to reveal new variables (Hammarberg, Kirkman, and de Lacey, 2016). This ability of the qualitative research has the potential not only to shed light on the carry-over benefits of aquatic physiotherapy for people with MS but also to discover its adverse carry-over effects. By gaining understanding of the carry-over benefits and adverse effects, it is possible for us to recommend future research questions examining the cause and effect relationships (Lapan, Quartaroli and Reimer, 2012). The concepts found in the qualitative studies will pave the way to conducting quantitative research (Hesse-Biber and Leavy, 2011). The findings of the qualitative research will be either corroborated or contradicted by conducting robust quantitative studies at a later date.

Despite aquatic physiotherapy's being one of the routinely offered interventions for people with MS, it is surprising that there is no qualitative research on its carry-over effects, especially from the perspective of people with MS. To explore the carry-over effects of the aquatic physiotherapy intervention it is necessary to listen to the views people who completed the programme.

Overall, there is limited understanding of the possible adverse effects. Nor is it clear whether any of these adverse effects is carried over. Future research exploring the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy might provide better understanding not only of the benefits but also adverse effects.

To date there has not been any qualitative research on the carry-over effects of aquatic physiotherapy, and we know nothing about the perspectives of people with MS on this topic. The inductive qualitative research methods are useful in accumulation of data on specific phenomena and generating knowledge. The knowledge-building processes of qualitative research methods lead to better understanding of the topic (Hesse-Biber and Leavy, 2011). Qualitative research provides thick description of the phenomena. It helps to unearth the language and meaning assigned by the participants who have first-hand experience of the phenomenon (Hesse-Biber and Leavy, 2011). It helps to explore under-researched areas such as the current topic by being open to learning new and unexpected information.

One of the reasons for reviewing the literature at the beginning of a research is to avoid replication of a similar study completed in the past (Creswell and Creswell, 2018). The preliminary literature review completed during the current research did not find any qualitative studies that had looked at the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. Lack of prior qualitative research is one of the main reasons for proposing a new qualitative research on the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. The findings of the proposed qualitative research will make a contribution to the knowledge on the carry-over effects of aquatic physiotherapy. Therefore, proposing a new qualitative study on this problem will not risk replicating a similar study on the same problem. The discussion presented in this Chapter justifies the need for conducting a new qualitative research exploring the perceptions of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. The following chapter presents the research questions for addressing the lack of qualitative research.

Chapter 5

Research Questions, Aim and Objectives

Chapter 5: Research Questions, Aim and Objectives

5.1 Research Questions

The preliminary literature review and rationale presented in the preceding chapter, identified a number of gaps in current knowledge and the need for understanding of the perspective of people with Multiple Sclerosis on the carry-over effects of aquatic physiotherapy. In seeking to fill these gaps, the research presented in this thesis will seek to answer the following research questions:

1. What are the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy?
2. How do people with Multiple Sclerosis perceive the carry-over effects of aquatic physiotherapy?

By answering these questions, therapists and service users will be able to develop a better understanding of the perspectives of people with Multiple Sclerosis on the carry-over effects of aquatic physiotherapy. The formulation of research questions was one of the most important starting points of a research journey (Mayo, Asano and Barbic, 2013). They determined the research design appropriate to this research and guided the researcher in choosing appropriate participants, methods and data analysis procedures. Although the research questions were mainly developed from the rationale and preliminary literature review, the context of the aquatic physiotherapy service at the Burrswood Health and Wellbeing Centre was also taken into consideration and accordingly the findings will be interpreted.

5.2 Aim

The primary aim of this research is to explore, better understand and explain the carry-over effects of aquatic physiotherapy from the perspective of people with Multiple Sclerosis.

5.3 Objectives

1. To explore the perspective of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy.
2. To gain a better understanding of the perspective of people with Multiple Sclerosis about the components of the carry-over effects of aquatic physiotherapy.
3. To develop a conceptual framework within which to explain the association between the components of the carry-over effects of aquatic physiotherapy from the perspective of people with Multiple Sclerosis.

The remainder of this thesis will demonstrate how these research questions were answered and how these objectives were met.

Chapter 5

Theoretical Perspectives

Chapter 6: Theoretical Perspectives

This chapter will present a detailed account of theoretical perspectives that have been influential in the each and every step of conducting the research presented in this thesis. Theoretical perspectives of the researcher have influenced the stages of research design, choice and implementation of research methods, carrying out the data analysis, interpreting the findings and evaluating the practical implications of this research. This chapter has two main sections. The first will discuss the philosophical aspects relevant to this research. The ontological and epistemological traditions appropriate for this research are presented. Likewise, researcher's ontological and epistemological position related to his physiotherapy professional practice and its relation to justifying his position in choosing Pragmatic philosophical approach for carrying out this research. The second section will justify the choice of the Classic Grounded Theory Methodology for carrying out this research and examine the popular Grounded Theory approaches. It will explain the reasons for adopting the Classic Grounded Theory approach for carrying out this research. It will justify and explain the suitability of the Classic Grounded Theory approach for the pragmatic position of the research and researcher. The section will present rationale for the suitability of the Classic Grounded Theory approach in achieving the aim and objectives of this research.

6.1 Ontological and Epistemological Perspectives

Ontology is concerned with "the nature of reality and its characteristics" (Creswell, 2013, p.20). Epistemology considered to be the "nature of the relationship between the knower or would-be knower" (Guba and Lincoln, 1994, p.108). Ontological and epistemological aspects are closely associated with each other hence these are discussed together in this section. Scholars' beliefs about the nature of reality are broadly categorised into two types. These are a single objective reality and multiple realities (Nicholls, 2009). The philosophies associated with these are referred as Objectivism and Subjectivism (Constructionism).

6.1.1 Objectivism versus Constructionism

Researchers who believe in a single objective reality are associated with the ontological and epistemological position of objectivism and are called as realists (Bryant, 2017). According to realists there is an external world that exists outside the mind of the knowers (Nicholls, 2009). The realists' position is categorised into the ontological and epistemological position of objectivism. The research approaches that are commonly associated with objectivism are positivist and post positivist traditions. Positivists are staunch realists who believe in a single reality and do not accept multiple realities (Nicholls, 2009). Post-positivists are also realists but accept the influence of context on the nature of reality. Realists believe that it is possible to observe, objectively deduce and find reality (Nicholls, 2009). Realists always look for essences and most commonly use quantitative data measures with an intention to verify prior theories and test hypothesis (Nicholls, 2009). Empirical or scientific research looking for cause and effect relationship between the dependent and independent variables are the best examples of objectivism. The following paragraph explains the context of the researcher's ontological and epistemological position and how it is related to the objectivism and the development of this research.

During the course of this doctoral research, the researcher's ontological and epistemological position has undergone significant changes. Before starting doctoral study, the researcher had limited knowledge and understanding of the ontological and epistemological traditions. Reflection during the course helped the researcher to analyse and evaluate his own ontological and epistemological position and approaches suited to achieving the aim of this research. The initial stages of planning of this research were centred on the researcher's past experience and prior assumptions about knowledge. Although the researcher has some experience of carrying out qualitative research, he has more experience in carrying out quantitative research studies within the post-positivist traditions. Therefore, the preliminary research questions developed prior to the stage of ethics proposal were entirely different from the current research questions. The formulation of the preliminary research questions was rooted in the post-positivist experience and objectivist associations of the researcher. The hypotheses developed from those preliminary research questions were intended for deducing, testing and

verifying the preconceived assumptions. For example, the preliminary research questions were planned for examining the carry-over effects of aquatic physiotherapy on a small number of aspects such as fatigue, balance, gait and health-related quality of life of people with MS. However, the training on the professional doctorate course introduced the researcher to a wide range of paradigms that might provide better exploration of the concept of carry-over effects and offer deeper, wide-ranging new insights into them rather than merely investigating the prior assumptions. Although post-positivism is a prevailing paradigm in the physiotherapy discipline, it was not suited to achieving the primary aim of the current study. Thus, the quantitative research designs within the post-positivist paradigms were discarded as they were not suitable for the current study.

The researcher has experience of conducting quantitative research projects. During the data analysis and interpretation of findings of those quantitative studies, the researcher was sceptical about the validity and suitability of the objective measures to analysing the subjective feelings, views, behaviour or experience of people. For example, the researcher was doubtful about the suitability of objective numerical scales for measuring subjective feelings of fatigue and health-related quality life. Nicholls (2009) argues that quantitative research based on positivist beliefs is not suitable to answering questions that are pivotal to understanding health. The researcher agrees with Nicholls' (2009) view and does not believe that a single objective positivist / post-positivist position would answer the subjective nature of experience such as fatigue or quality of life. Although positivist / post-positivist approaches are dominant in the health related research, this researcher believes that it is not necessarily suitable to all types of research. Positivist/Post-positivist approaches suggest that the researcher must be objective and detached from the data (Nicholls, 2009). Objectivity in the quantitative studies is achieved by using numerical scales; however, these approaches are not appropriate to conducting studies exploring multiple perspectives of people. Because the primary objective of the current study is to explore and understand the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy, a single objective reality is not a suitable stance for this doctoral study.

Unlike objectivism, constructionism rejects the perspective that there is an external reality that could be discovered (Crotty, 1998). According to constructionist, meaning about an object is made up by the subjective mind. In staunch constructionism, meaning is imposed on the object by the subject without any active interplay or contribution from the object. Staunch constructionism is not suitable for carrying out this research because

one of the objectives of this research is to listen to participants views and seek information from their point of view. Alternative to objectivism and constructionism, pragmatism supports the perspective that the reality exists external to the mind as well as within the mind and is influenced by different points of views, time and interpretation of the people involved (Creswell, 2013). Similarly, the researcher of the current study also believes that these perceptions are situational and influenced by the time, culture and social context. The researcher acknowledges that the meaning of the data is derived from the interplay between the researcher and participant. The researcher acknowledges multiple realities and believes that it is important to represent multiple views by listening to the views of multiple participants and including them in the development of the meaning. This aspect of researcher's view is closer to the perspectives of constructionism.

Once the interaction between the researcher and participant is complete, the researcher believes that it is important objectively to abstract concepts from the data and discover latent patterns in the data. This aspect of researcher's view is closer to the perspectives of objectivism. Therefore, the researcher's standpoint presented here transcends the perspectives of constructionism and objectivism.

6.1.2 Pragmatism

The combined constructionist and objectivist standpoint of the researcher presented in the earlier section is similar to the epistemological and ontological perspectives of a pragmatist. Unlike objectivism and constructionism, pragmatism acknowledges the value of both subjective and objective evidence in making a sense of the reality (Creswell, 2013). If we position objectivism and constructionism at the opposite ends of a continuum, then the position of pragmatism can be anywhere along that line.

According to pragmatism, "reality is what is useful, is practical and works" (Creswell, 2013, p.37). This statement of pragmatism aptly fits with the purpose of this professional doctorate research. Because of the nature of the professional doctorate study, this research initiated a study to explore, better understand and explain the effects of a unique aquatic physiotherapy programme developed by the Burrswood Health and Wellbeing Centre for people with Multiple Sclerosis. Consequently, right from the beginning of this research the main purpose has been on the practicality, relevance, usefulness of the findings of this research to people with Multiple Sclerosis and the

aquatic physiotherapy programme provided by the Burrswood Health and Wellbeing Centre. Therefore, it was important for the researcher to focus on the main purpose of this research rather than enforcing a predetermined objectivist or constructionist paradigm on the research process.

The selection of pragmatism as a suitable approach for the current research is also linked to the main tenets of the professional doctorate education. One of the main purposes of professional doctorate research is to use the study findings and make recommendations that have practical application to the individuals and organisations associated with this research. A pragmatist approach is suitable to exploring a research area whilst maintaining the emphasis on the practical applicability of the research findings (Cherryholmes, 1992). This emphasis of pragmatism makes it more appropriate to carrying out this research. The researcher's beliefs are similar to the set of beliefs followed by pragmatists. The researcher believes that the interpretation of the findings of this doctoral research should be based on the practical consequences of those findings to people with MS, physiotherapists and the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre.

Although the value of knowledge may be influenced by the context and time, the researcher believes that it is based on its usefulness to the knower. Similar to the researcher's belief, pragmatism stresses the usefulness and applicability of knowledge for users. This perspective of pragmatism about the knowledge has been considered as one of the primary tenets of pragmatism (Bryant, 2009). In the current doctoral research, the value of the new knowledge generated from this study will be determined by its usefulness and application to people with MS and the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre.

There are many versions of pragmatism. The rhetoric of different pragmatists resulted in misinterpretation about the core attributes of pragmatism (Crotty, 1998). A commonly reported criticism of the pragmatic approach is that it allows researcher to use "whatever works" based on their practical feasibility rather than their appropriateness. The choice of pragmatism approach for the current study was not simply based on the practical feasibility of 'whatever works', but on the rationale of 'what is most suitable'. For example, decisions about adopting various methods were made following rigorous evaluation of the appropriateness of the methods. The rationale for choice of the Grounded Theory

methods will be justified in the latter part of this chapter. The scientific rigour of this study will be explained further in the chapter 7 of this thesis.

6.2. Methodology

6.2.1 Research Design

Research designs can be broadly divided into fixed, flexible and multi strategy kinds (Robson, 2011, p.74). Fixed designs frequently use quantitative data collection methods. The primary objectives of this doctoral study are to explore, better understand and explain the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy and develop a conceptual framework from the views collected from people with MS. Therefore, the quantitative fixed research designs like randomised controlled trials, quasi experimental and correlational designs are not suited to achieving the aim of this research. Another issue with quantitative research designs is that they are guided by predetermined hypotheses and restrict the investigations to the areas that are commonly predictable within a specialist field.

A mixed strategy design combining qualitative and quantitative methods was considered during the preliminary stages of this doctoral study. However, mixed methods design was discarded during the development of the research proposal because qualitative design is deemed adequate for achieving the main aim of this research. Exploration, which is one of the aims of this research, can be best achieved by a flexible qualitative research design (Robson, 2011). Unlike quantitative research designs, qualitative research design will lead the research into unforeseen areas by exploring deeply into participants views and inviting the unexpected (Holliday, 2016). This specific advantage of the qualitative research design makes it most appropriate to achieving the objectives of the research presented earlier in this thesis. The researcher also acknowledges the multiple realities that are best achieved by using flexible qualitative designs (Petty, Thompson and Stew, 2012a). The current research is intended to develop new knowledge of the carry-over effects of aquatic physiotherapy by exploring and gaining new insights into the perspectives of people with MS. Therefore, qualitative research designs collecting participants' subjective views whilst acknowledging multiple realities are considered the most suitable for carrying out the research presented in this thesis.

6.2.2 Qualitative Approach

Although there are many approaches available for conducting qualitative studies, the five most commonly used in health, social and behavioural sciences are narrative, phenomenological, ethnographic, case study and Grounded Theory (Creswell, 2013). The narrative approach mainly focuses on the life stories of individuals with the aim of understanding their experiences in relation to life events that are chronologically connected (Petty, Thompson and Stew, 2012b). It is not the purpose of this research to understand the life stories of people with Multiple Sclerosis nor the events that happened in their lives; hence a narrative approach is not suited to this research. The phenomenological approach aims at understanding individual's interpretations for developing in-depth meaning of their lived experiences (Flood, 2010). Unlike the narrative approach, the constructed meanings of lived experience in phenomenology are common to more people who have experienced similar phenomena (Creswell, 2013). Understanding the essence of lived experience of a specific phenomenon common to people with Multiple Sclerosis is not the purpose of the proposed doctoral study, therefore phenomenology is not a suitable approach.

This doctoral research is not intended to observe and describe shared cultural behaviour, beliefs and practices of people with Multiple Sclerosis; therefore, the ethnographic approach is not suited to this research. The case study approach focuses on "developing an in-depth description and analysis of cases" (Creswell, 2013, p.104) by using multiple methods. The focus of this doctoral study is not aimed at description and analysis of a group of people with Multiple Sclerosis, therefore a case study approach is not suitable for this study. The main aim of this research is to explore, better understand and explain the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. One of the objectives of this research is to develop a conceptual framework that explains the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. These aims and objectives are developed because of lack of knowledge in this topic. "Grounded Theory is ideally suited to areas of research where there is little understanding of the social processes at work" (Hunter, et al., 2011, p.7). To develop a new conceptual framework, the Grounded Theory is considered the most suitable approach. The following section will present and justify the choice of Grounded Theory approach for carrying out this research.

6.2.3 Grounded Theory Methodology

Grounded Theory methodology was developed in the 1960's by two social science researchers: Barney Glaser and Anselm Strauss (Holton and Walsh, 2017). The authors developed Grounded Theory methods as alternative research techniques that could help the researchers to go beyond the predominant methods of verification and description of quantitative data. Instead of testing existing theories and describing subjective views, Grounded Theory methodology offered a new set of systematic and rigorous methods that are capable of generating new theories grounded in data. One of the interesting aspects of the collaboration between Glaser and Strauss is that they came from different ontological and epistemological backgrounds. While Glaser's research experience was influenced by the post-positivist quantitative approach, Strauss's research experience was influenced by the interpretivist qualitative approach (Holton and Walsh, 2017). The unique collaboration of Glaser and Strauss during the development of Grounded Theory provided an opportunity for identifying the strengths of each and bringing together analysis to be methodologically robust. the merger of the differing perspectives. Glaser and Strauss did not acknowledge the uniqueness of their collaboration, nevertheless Glaser indicated that the key elements of Grounded Theory emerged from the combination of quantitative and qualitative methods which were based on the teachings of Lazarsfeld (Glaser, 1998). Because of this combined perspective, Grounded Theory methodology allow for induction and deduction at the same time (Stern, 1980) and this exceptional property has been a remarkable advantage of this methodology.

There are three popular versions of Grounded Theory methodologies that are most frequently used in qualitative research (Andrews, et al., 2017). These versions are commonly known as: Classic Grounded Theory, Straussian Grounded Theory and Constructivist Grounded Theory. It is acknowledged in the research community that different approaches of Grounded Theory have different philosophical associations. Since Grounded Theory methodology is considered suitable for carrying out this research, it is important for the researcher to decide whether to follow the tradition of any one of the popular Grounded Theory approaches. As determined in the earlier section of this chapter, the pragmatic approach using qualitative data collection methods is appropriate to achieving the aim and objectives of the current study. Researcher evaluated the appropriateness of the popular Grounded Theory approaches to the pragmatic tradition. Following this evaluation, the researcher decided to use the Classic Grounded Theory approach.

Glaser coined the term “Classic Grounded Theory” to differentiate the original methods from the modified versions (Glaser and Holton, 2004). Because of Glaser’s continued adherence to the original approach and further explication of the initial methods, some researchers refer to the Classic Grounded Theory approaches as the Glaserian approach. Hereafter, this approach will be referred to as the Classic Grounded Theory approach.

The current research implemented the essential Classic Grounded Theory methods that are described in the seminal text book “*Discovery of Grounded Theory: Strategies for Qualitative Research*” by Glaser and Strauss (1967, 1999) and the sub-sequent publications by Glaser and his followers (Holton and Walsh, 2017) who further refined and restated the initial methods. The strategies described in this seminal work are widely used in conducting qualitative research. The essential components of Grounded Theory methodology considered for the current research are: simultaneous and recurrent data collection and analysis, generate concepts grounded in the data, advance theory generation by theoretical sampling and constant comparative data analysis, and writing memos for conceptualising and explicating the unanticipated relationships between codes and categories. A detailed account of these methods is presented in the Methods chapter of this thesis.

There are three main reasons for choosing the Classic Grounded Theory methodology for carrying out this research. Firstly, Classic Grounded Theory is suited to achieving the primary research aim and objectives of the current study. Secondly, it is appropriate considering the ontological and epistemological position of this research. Thirdly, Classic Grounded Theory methodology provided robust approaches for completing rigorous research at doctoral level. These three reasons will be explained further in the following paragraphs.

The first and foremost reason for adopting the Classic Grounded Theory methodology for this research is its suitability to achieving the primary aim and objectives of this research. The primary aim of the current research is to explore, better understand and explain the processes associated with the carryover effects of aquatic physiotherapy. One of the objectives for achieving the primary aim of this research is to explore and better understand the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. To achieve the primary aim and objectives of this research, the research design needs to implement three main tasks. The first will be to

gather pertinent information in the form of qualitative data from people with MS who have completed the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre. The second will be to conduct data analysis using standardised procedures. The final task will be to develop a substantive conceptual framework grounded in the data.

Classic Grounded Theory methodology is widely published in peer reviewed research journals globally, which suggests that it is accredited by researchers as a valid methodology. Classic Grounded Theory methodology assumes that the behaviour of a group of people and the approaches they use to resolve their common concerns can be conceptualised as patterns in their behaviour (Andrews, et al., 2017). This methodology provides researchers with rigorous tools for identifying unanticipated relations between concepts and conceptualising new patterns. The conceptualised patterns can be used in developing substantive theories that are grounded in the participants' views. The unit of analysis of Classic Grounded Theory methodology is the pattern of behaviour among a group of people, rather than the description of each individual's behaviour (Andrews, et al., 2017). By implementing inductive reasoning procedures, the Classic Grounded Theory methodology endeavours to explore and better understand the processes associated with the human behaviour. The substantive theories generated from the Grounded Theory methodology are helpful in developing a better understanding and explaining the behaviour of a group of people within a substantive area. The theory generated by the Classic Grounded Theory methodology is directly applicable to the area that the data is collected (Glaser, 2014). Besides, the theory is also applicable to other similar areas (Glaser, 2014b). Because this methodology is able to develop a substantive theory that is directly applicable to the local area, it is considered suitable to achieving the primary aim of this research.

Classic Grounded Theory methodology is suitable to developing substantive theory from qualitative data (Walsh, et al., 2015). The objective of the current research is to explore the carry-over effects from multiple research participants and gain a better understanding by conceptualising patterns in the behaviour while valuing individuals' views. Because the Grounded Theory methods are able to collect and analyse the qualitative data they are suitable to achieving the objectives of this research. Even though Classic Grounded Theory methodology gained more popularity from its use in qualitative research, they are considered suitable for carrying out research using any type of data; quantitative, qualitative and mixed type of data (Walsh, et al., 2015). This unique ability of Classic Grounded Theory methodology also makes it suitable for the current research. Although the primary methods used for collecting information from the research participants in the

current research will be qualitative, to understand the relevance of the findings of this research, the researcher will be using the findings from quantitative, qualitative and mixed methods research studies that are relevant to the categories that will be generated in this research.

The second reason for choosing Classic Grounded Theory methodology for this research is its fit with the ontological and epistemological position of this research. Classic Grounded Theory methodology is frequently used by the researchers from a wide range of professional fields with diverse philosophical backgrounds. The essential methods of Classic Grounded Theory are suitable for adopting them to the philosophical stance of the researchers (Holton, 2009; Holton and Walsh, 2017; Ralph, Birks and Chapman, 2015; Walsh, et al., 2015). The flexibility and adaptability of the Classic Grounded Theory methods paved the way for the generation of diverse streams of Grounded Theory approaches. Different approaches of Grounded Theory are developed by different scholars from a wide range of ontological and epistemological standpoints. Classic Grounded Theory methodology is implemented in different ways by different researchers according to their philosophical standpoints (Walsh, et al., 2015). The results are also interpreted accordingly given the dominant ontological and epistemological association of the researches' profession (Walsh, et al., 2015).

The use of Classic Grounded Theory methodology can be found along the spectrum of divergent philosophical perspectives (Timonen, Foley and Conlon, 2018). Classic Grounded Theory methodology is considered suitable for any ontological and epistemological approach (Holton and Walsh, 2017; Timonen, Foley and Conlon, 2018). For instance, Classic Grounded Theory methodology is used by researchers from positivist, post positivist, constructivist and critical realist positions. This methodology is also suitable for use by researchers using combined qualitative and quantitative research approaches such as mixed methods research. Availability of such variants of philosophical approaches in Classic Grounded Theory research suggests that this methodology is suitable for use by researchers from different ontological and epistemological standpoints. Therefore, it is not necessary to adhere to any one particular theoretical approach while implementing the essential methods of Classic Grounded Theory (Ralph, Birks and Chapman, 2015). Because Classic Grounded Theory methodology permit researchers to place specific emphasis on particular aspects, the essential methods can be adopted to researcher's philosophical position. For this reason, Classic Grounded Theory's essential methods are considered suitable for developing a substantive conceptual framework and adhering to the researcher's

pragmatist stance necessary for achieving the aim of this research. Besides, the associations are also found between the Classic Grounded Theory and pragmatism. The origins of Grounded Theory methods are associated with the roots in pragmatism (Timonen, Foley and Conlon, 2018). This influence of pragmatism in the origins of Classic Grounded Theory perhaps explains why its methods are readily adaptable to any ontological and epistemological viewpoint without a problem. The flexibility of the Classic Grounded Theory methodology and its association with pragmatism also supports the justification for considering it suitable for this research. The aforementioned advantages of the Classic Grounded Theory make its methods more apt for the current study. Classic Grounded Theory methodology is considered suitable for this research and its methods of data collection and analysis are implemented in this research. The detailed account of the procedures implemented in this research will be explained in the Methods chapter of this thesis. The following sections will discuss the reasons for not selecting Straussian and Charmaz's Grounded Theory approaches for this research.

Another popular Grounded Theory approach was developed by Anselm Strauss, one of the co-founders of the original Grounded Theory methods. Strauss departed from the original methods, while Glaser continued, faithful to the original Grounded Theory methods that were jointly developed with Strauss (Heath and Cowley, 2004). After separating from Glaser, Strauss worked in collaboration with Corbin and reformulated the Grounded Theory methods that are commonly referred as the Straussian Grounded Theory approach. The Straussian approach is not suitable for the current research. Although the detailed guidance and analytical steps suggested by Strauss and Corbin (1990) are considered helpful for the researchers, excessive emphasis and focus on the analytical techniques received criticism. Charmaz contended that the complex and rigid maze of coding procedures prescribed by Strauss and Corbin are not appropriate for carrying out a flexible inductive qualitative research (Charmaz, 2000). The Straussian approach is also criticised for being unnecessarily complex and excessively rigid. It provides minimal emphasis on induction as compared with deduction and verification. This increased emphasis towards deduction and verification may encourage novice researchers to test existing rather than emerging new knowledge (Heath and Cowley, 2004). Steps involved in the coding process, verification of the concepts and the development of axial coding navigated the direction of the Straussian approach towards positivist traditions. This approach develops linear model frameworks that are positivistic and intended for explaining causes, contexts and consequences related to a phenomenon (Heath and Cowley, 2004). The Straussian approach was criticised for designing a rule book that is overly positivistic in nature. The detailed steps of analysis

recommended by the Straussian approach are too rigid for exploring new concepts and have the potential for full description rather than emergence of theory. The Straussian approach may limit the flexibility offered by the Grounded Theory methods. After Strauss's death, Corbin reformulated the Straussian Grounded Theory and which seem to have more associations with constructivist Grounded Theory (Kenny and Fourie, 2015). Because of the unnecessary complexity of the methods of the Straussian approach and the positivistic associations, it is not suited to carrying out this research.

Kathy Charmaz, a former student of Glaser and Strauss, developed a third version of the Grounded Theory approach that is characteristically constructivist (Kenny and Fourie, 2015). Charmaz called this new approach constructivist Grounded Theory, which has an emphasis towards constructivism and the role of the researcher. Although Charmaz claims to be constructivist, a recent publication suggests that the constructivist GT helps the researcher to discover theory. The term "discovery" applies to the finding of something that exists. Does this mean, Charmaz's approach is similar to Glaser and Strauss in discovering an external reality?

The staunch constructivist Grounded Theory approach developed by Charmaz received criticism for being too descriptive and having similarity to other qualitative descriptive approaches (Glaser, 2012). Charmaz's approach legitimises the role of researcher and encourages co-construction of concepts by the researcher during the interview and analysis. The degree of emphasis provided by Constructivist approach on the mutual interaction between the researcher and participant and the level of co-construction recommended by this approach gave more or equal weight to the role of the researcher in the generation of concepts. This is in contrast to one of the purposes of the Grounded Theory, which is to help the researcher to discover latent patterns in the data rather than generate. Charmaz approach also received criticism for articulating the concerns of participants from the perspective of the researcher (Glaser, 2012). This approach has the potential to force the data towards preconceived ideas of the researcher.

The degree of co-construction recommended by Charmaz received criticism for purposefully legitimising forcing of the concept development by the researcher (Martin and Gynnild, 2011). Glaser argued that legitimising the interpretation of the researcher will force the emergence of concepts towards 'pet' codes (Glaser, 2012). Although the researcher of the current doctoral study acknowledges that it is not possible to completely separate the researcher from the data, the researcher believes that it is important to generate concepts as objectively as possible. This standpoint of the

researcher was presented earlier in the ontological and epistemological section of this chapter which has been described as the pragmatist approach. The researcher believes that to develop new insights and secure better understanding, it is very important to explore and represent views of the research participants rather than researcher's. The Charmaz approach permits interviewer to have an "imaginative engagement with data" (Charmaz, 2008, p. 168). This further endorses the role of the researcher in creating concepts from their own imagination. This level of imaginary engagement permitted by the Charmaz's approach became worrisome to this researcher.

The Charmaz's approach expressly legitimises the involvement of interviewer and allows them to incorporate their views during the development of the concepts from the data. Researcher of this study believes that the Charmaz's approach may dilute the participants' concerns with the views of the researcher. The degree of legitimisation suggested by Charmaz may allow a subconscious steering of the procedures of data collection and analysis and a development of findings that explicitly reflect the investigator's preconceived beliefs. This contradicts with the researcher's beliefs about the degree of involvement of the researcher in generating new concepts. Although the researcher acknowledges the role of the researcher in generating theory, the researcher do not want to increase the role to an extent that there is a potential for enforcing the concepts. For this reason, steps were taken to decrease the role of the researcher as much as possible. In addition to the points discussed earlier, the constructivist Grounded Theory is also criticised for using a narrative approach in developing the theory. Constructivist methods rarely culminate in an explanatory theory, rather they develop a theory as a story based on the interpretative understanding of the researcher (Hallberg, 2006). Charmaz's Grounded Theory is criticised for deviating from the process of conceptualisation to become a descriptive approach. By contrast, one of the objectives of the current research is to develop a substantive conceptual framework that explains the processes involved in the carry-over effects rather than developing a descriptive story. For the reasons explained in the preceding paragraphs, Charmaz's approach is not considered suitable to carrying out this research.

As discussed in the earlier section of this chapter, it is not appropriate to plan the study by adhering either to a positivist or constructivist tradition. Staunchly following either tradition or enforcing a popular approach will limit the findings of this research. Because of the pragmatic approach of the current study, following any rigid philosophical streams of Grounded Theory approaches will be detrimental to this research.

Classic Grounded Theory methodology informed by pragmatic approach allow the researcher to acknowledge, combine and transcend the constructivist and objectivist traditions. During the process of induction and conceptual abstraction the researcher acknowledges the constructivist position of the researcher in generating concepts. During the process of constant comparison, verification of concepts and looking for patterns in the data, the researcher acknowledges the objectivist position. Essentially, Classic Grounded Theory provides methods that are readily adapted to the pragmatic positioning of this research. Whilst keeping the ontological and epistemological position of pragmatism and the aim of research at the heart of designing this research, Classic Grounded Theory methodology is selected for carrying out this research.

Classic Grounded Theory methods are suitable for developing substantive theories that are applicable to local areas (Kenny and Fourie, 2015). Similarly, one of the objectives of this research is to generate a substantive conceptual framework that explains the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. To improve the rigour and trustworthiness of the qualitative research it is necessary to follow standardised procedures. Classic Grounded Theory methodology provide robust procedures for achieving the tasks of data collection and analysis (Holton and Walsh, 2017); which improves the rigour and trustworthiness of this qualitative research. For reasons discussed in the preceding sections of this chapter, Classic Grounded Theory methodology stands out as the most appropriate for achieving the aim and objectives of this research. Therefore, Classic Grounded Theory methodology will be used for carrying out this research. The chapter on methods will provide a detailed account of the methods that will be implemented in this research.

6.3 Theoretical and Conceptual Framework

The theoretical and conceptual frameworks are used for designing quantitative and qualitative research (Maxwell, 2005). There is some ambiguity among scholars about the purpose of theoretical and conceptual frameworks in the qualitative research (Anfara and Mertz, 2014; Green, 2014). Although the terms conceptual and theoretical frameworks are used interchangeably in the research literature, Imenda argues that there is a difference between them (Imenda, 2014). While a theoretical framework is developed from a prior theory, a conceptual framework is developed by the researcher using available evidence. A theoretical framework provides information about the variables of

a phenomenon and their associations. A theoretical framework is useful for designing a research that aims to progress the knowledge of an established theory. A prerequisite for using a theoretical framework in any research is that there should be at least one theory available on the topic area of research. For example, a study exploring the phenomena of self-efficacy could be designed by using the theory of self-efficacy and its framework. Unlike the preceding example, a preliminary literature review carried out during the initial stages of this doctoral research did not find any established theories that have the potential to explain the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. There was no theoretical framework on which the current research could be designed. Therefore, the current study could not use any established theoretical frameworks.

The conceptual frameworks are useful for the research areas where there is no single established theory. These are designed by the researcher using prior evidence, researcher's assumptions and experiences (Imenda, 2014; Maxwell, 2012). A conceptual framework can be displayed as a visual map that presents the relationship among the 'assumed' concepts and their variables. Although conceptual frameworks are useful for providing a structure to a study, they are not commonly used in the Grounded Theory research (Green, 2014). An article by Durham, et al. (2015) recommended the use of conceptual frameworks by doctoral studies however it did not discuss the appropriateness of their use in the Grounded Theory research. Since conceptual frameworks can provide excessive guidance towards the preconceived concepts, they are not encouraged for exploring the new areas (Corbin and Strauss, 2007). Although a conceptual framework is helpful for advancing a low-level theory to a mid-level theory, a preconceived framework can be detrimental to the emergence of new concepts and identification of unanticipated relationships among variables. For the preceding reasons, a detailed conceptual framework was not developed before implementing the data collection and analysis. Instead, basic level visual 'mind map' (Ravitch and Riggan, 2012) was developed to maintain the focus of this research. The map depicts the activities that lead to the identification of lack of theory on the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. The map depicts the procedure that will be implemented in answering the research question.

A new conceptual framework grounded in the data is developed from the findings of this research. This is displayed as a schematic map (Figure 6) at the end of the Findings

chapter. Zimmerman's Theoretical Framework of Individual Psychological Empowerment (Figure 9) was identified as the suitable framework for conceptualising the findings. The Grounded Theory literature review was conducted after the emergence of core category of empowerment in this research. Further integration of findings of this research with the existing literature developed the Burrswood Conceptual Framework of Empowerment (Figure 10). A detailed account of this new framework, the components of the empowerment and their associations will be presented in the Discussion chapter of this thesis.

Chapter 7

Methods

Chapter 7: Methods

For the context of this thesis, methods are considered as the techniques and procedures used to gather the data and conduct the analysis. This chapter provides a detailed account of the methods selected and implemented in this research. It describes the design of the study and give reasons for the decisions made. The research completed during this Doctoral study adopted two qualitative data collection methods: 1) 'Letter to a friend' and 2) Interview. The information presented in this chapter is organised in five sections which are presented in the following order: Ethical considerations, Sampling, Data collection, Data analysis and Scientific rigour.

7.1 Ethical considerations

Considering research ethics is essential when planning and conducting research. The ethical aspects of this research were addressed by adhering to the seven principles of research ethics (Gelling, 1999), the framework recommended by the Chartered Society of Physiotherapists based on the Research Governance Framework for Health and Social Care (CSP, 2013; DH, 2005) and the research ethics guidance provided by the Royal College of Nursing (RCN, 2011).

Before submitting the research proposal to ethics committee, the researcher involved two MS patients from the local MS Society support groups and received feedback about the clarity of information presented in the participant information sheet and consent form. The researcher modified the information sheet from the feedback received.

7.1.1 Research Ethics and Governance Approval

Full ethics approval was received from the Faculty Research Ethics Panel (FREP), Anglia Ruskin University, on 23/02/2015 (Appendix 1). A further amended approval was received on 18/02/2016 (Appendix 2).

7.1.2 Ethical Principles

Ethical guidelines adhered to in this study will be discussed under the seven principles recommended by Gelling (1999). These are “beneficence, non-maleficence, fidelity, justice, veracity, confidentiality and respect for autonomy” (Gelling, 1999 p.39).

a) Beneficence

This principle indicates that all research should be intended to improve knowledge and benefit the study area. This doctoral research is aimed at exploring, better understanding and explaining the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. The results of this study could help patients and therapists in evaluating the benefits of an aquatic physiotherapy programme for people with MS, enabling them to make evidence-based decisions. The new knowledge gained from this research could be helpful in planning future services that are beneficial to people with MS. The results of this study could help the Burrswood Health and Wellbeing Centre determine the need for continuation of the existing service and / or propose changes.

b) Non-maleficence

This principle indicates that research should minimise the risk of harm to participants and researcher. The purpose of this doctoral research is to explore the effects of an intervention that was completed in the past. The study did not apply any intervention therefore participation in the study is unlikely to cause any physical harm. However, questions used during data collection could make participants recall the severity of their problems which might lead to discomfort. If discomfort was prolonged, participants would be provided with information about the counselling services and asked to seek support. Unintended psychological and emotional risks were carefully considered when planning the questions. The risk of financial cost is minimal as there is no cost to participation in this research. The face-to-face interview participants were required to arrange their own transport.

The risk of physical harm to the researcher during interview was unlikely. The research was not intended to explore sensitive issues. Hence it was unlikely that the research would trigger any aggressive behaviour of the participants. Face-to-face interviews were conducted in a private room close to Reception at the hospital. The researcher booked the interview room by contacting the receptionist and reception staff were made aware of the in and out times. The researcher carried a working mobile phone and would have

called reception staff in case of emergency. It was unlikely that the researcher would develop any psychological problems from the data, because the researcher is a qualified senior physiotherapist who has experience of working with patients with MS and other complex neurological conditions. If the researcher was to become emotionally influenced by the data then the researcher would initiate a debrief meeting with the first supervisor or mentor.

c) Fidelity

This principle advocates building trust between the participant and researcher. Trust was sought by providing full information about the risks and benefits of the research. Participants were informed that they would not benefit directly by participating in the current study; however the knowledge developed could help in planning future services. Participants were informed about the chance of temporary discomfort and were directed to the counselling support available from the MS Society, UK.

d) Justice

The study provided equal opportunity to all suitable participants. There was no reward for participation. Participants were recruited from a private charity hospital and were not linked to the National Health Service (NHS, UK) hospital. Hence, NHS ethics approval was not required to conduct this study. Upon approval from the Faculty Research Ethics Panel (FREP) the result of the ethics committee approval was forwarded to the Burrswood Health and Wellbeing Centre for their records.

e) Veracity

This principle recommends researchers tell the truth to participants. The researcher provided a participant information sheet with full details of the study and at no time was any information about the study withheld from potential participants.

f) Confidentiality

Participants' details and personal information were kept in a locked cabinet at the researcher's academic office. They were coded by using numerical codes. The raw data collected from the interviews and letters were kept separate from the personal information in a different locked cabinet. Participants' personal information was not used in the writing of the thesis and anonymity of participants was maintained throughout. Confidential personal information will be retained in the locked cabinet until the

successful completion of the Doctoral study. These details will be destroyed using the confidential University of Brighton shredding services. Any information stored on the computer was password protected and will be deleted after completion of the Doctoral study. Data protection principles were adhered to by using the Data Protection Act, 1998 guidelines.

f) Respect for autonomy

Participants received information about the study before they gave consent; thus each had autonomy of thought, will and action to make a decision whether to participate in the study. Concerns about retribution and power influence were carefully considered and avoided while recruiting participants (Long and Johnson, 2007). The researcher was external to the therapy environment and not employed by the Centre. The researcher was not involved directly in the recruitment of participants, which consequently limited the extent of professional power and coercion. The treating therapists signposted relevant patients by providing recruitment letters about the study. They refrained from persuading patients to participate in this study thus limiting their professional power in coercion of participation. The treating therapists were not involved in the research study: thus they do not benefit from recruiting participants.

7.1.3 Right of withdrawal

The participant information sheet assured participants that they had the right to withdraw from the study without notice. Participants had the right to decide and refuse the researcher use of their data and have them returned or destroyed. Participants were assured there was no penalty for not participation or withdrawal and their decision would not affect their rights for current or future therapy.

7.1.4 Use of Data

Participant information sheet advised about the use of data. The data were used for analysis and completion of this doctoral research. The study is presented as a thesis and submitted as part of the final submission for the professional doctorate course exam. The findings of the study could be disseminated in various forms at local, national and international events; professional, service users meetings; and research interest group network events. Journals could be approached for publication of the findings and study details could be published subject to approval from the journals. Information about the study could be shared and made available in the digital media. The study also could be

disseminated by the submission of details to newspapers and magazines. The findings of this study could be used to support future research projects and funding applications.

7.2 Sampling

This section will provide information about the suitable research sample for this study, justify the two sampling methods and the procedures involved in the implementation of these.

7.2.1 Sample

One of the objectives of this research is to explore the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. To achieve this objective 150 people with MS who had completed a programme of six 1-to-1 aquatic physiotherapy sessions at the Burrswood Health and Wellbeing Centre were identified as a suitable sample for this study.

7.2.2 Non-probability Sampling

Probability and non-probability sampling methods are the most commonly employed sampling methods in health and social care research (Higginbottom, 2004). Probability sampling methods recruit a small representative sample from a large population so the results from this small sample can be generalisable to the larger population. These are appropriate to conducting quantitative research (Patton, 2002). Marshall (1997) argued that probability sampling techniques are not suitable for qualitative research approaches, claiming they are “neither productive nor efficient” (p.524). By contrast, non-probability sampling methods are suitable for qualitative studies because they offer a flexibility which can yield a deeper insight into the beliefs, attitudes, perceptions and experience of people than is afforded by probability sampling (Marshall, 1997). Likewise, the current study is intended to explore and understand the views of people with MS by using qualitative research methods. Therefore, non-probability sampling methods were employed in this research. Based on the tenets of the Classic Grounded Theory

approach, two non-probability sampling methods were employed at different stages of this study. Purposive sampling (see section 7.2.3) was employed during the initial stages and theoretical sampling (see section 7.2.4) in the latter. A detailed account of these methods and justification for their choice are presented in the following sections.

7.2.3 Purposive Sampling

In purposive sampling the sample is intentionally selected and recruited from a group of potential participants who have had experience of the topic under exploration (Higginbottom, 2004). The advantage of purposive sampling is that the data will be information-rich on the central theme of the research topic (Patton, 2002). Participants selected through this method can share their experience and provide a deeper insight into the research phenomenon. Glaser (1978) advocated purposive sampling as a necessary approach in the initial stages of Classic Grounded Theory study to ensure that the study begins with a focus on the research aim. Purposive sampling was also recommended by contemporary scholars as an appropriate sampling technique for the initial stages of the Grounded Theory research (Birks and Mills, 2015). It is essential that participants in a study be representative of the area under investigation. Purposive sampling ensured that participants who can provide valuable insight into the research topic are selected from the substantive area under investigation. Using this technique, 150 people with MS who had completed a programme of six 1-to-1 aquatic physiotherapy sessions at the Burrswood Health and Wellbeing Centre were identified as the suitable sample. This procedure provided an information-rich sample to achieve the aim of exploring, better understanding and explaining the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. As advocated by Classic Grounded Theory approach, the potential participants were not identified by their predetermined characteristics such as age, gender, level of disability and type of MS. The recruitment did not target for equal number of participants to represent diverse predetermined characteristics.

7.2.4 Theoretical Sampling

Theoretical sampling is regarded as one of the core quality requirements of Grounded Theory research (Engward, 2013; Birks and Mills, 2015; Harris, 2015). Theoretical sampling refers to identifying and recruiting future participants, for further data collection,

based on the concepts emerging from the previous data analysis (Engward, 2013). The purpose of Grounded Theory research is to develop a substantive theory relevant to a substantive area (Glaser, 2014a). Similarly, one of the objectives of this research is to develop a substantive conceptual framework within which to explain the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy service offered at the Burrswood Health and Wellbeing Centre. Because this study is focused on a substantive area, theoretical sampling did not go beyond the Burrswood Health and Wellbeing Centre. The researcher returned to the site of research after initial data collection and analysis to implement theoretical sampling, which continued until theoretical saturation was achieved. This will be explained in detail in the data analysis section of this chapter.

In the literature, there are inconsistencies in the implementation of theoretical sampling (Breckenridge, 2009; Moore, 2010). This issue was also emphasised by Charmaz (2006), who suggested that “theoretical sampling is interpreted differently by different researchers” (Birks and Mills, 2012, p.69). There are differing views on when it is best to start and finish theoretical sampling. The initial definition by Glaser and Strauss (1967) and further recommendations by scholars in the field of Grounded Theory suggested that theoretical sampling methods should be implemented from the beginning (Glaser, 1978; Glaser and Holton, 2007; Breckenridge and Jones, 2009; Charmaz, 2014; Birks and Mills, 2015). Considering the complexity of and confusion surrounding the theoretical sampling technique and inconsistencies in the literature, it was considered imperative to explicate the theoretical sampling employed in this study. The rest of this section will provide a detailed account of this method.

The analysis of raw data from the purposive sampling participants resulted in many codes relevant to the carry-over effects of aquatic physiotherapy programme. Data analysis and writing memos identified various concepts that needed further exploration. The emergence of these concepts required checking, challenging and confirming to understand the pattern (Engward, 2013). One of the concepts that emerged during data analysis was regular participation in the ‘group aquatic exercise classes’ after completion of the aquatic physiotherapy programme at the Centre. This became an important concept that needed further exploration. At this stage, the researcher was attempting to answer the question, “what groups or subgroups does one turn to next in data collection and for what theoretical purpose?” (Glaser and Holton, 2010). In order to improve the understanding and increase the richness of the concept of ‘regular participation in physical activity’, theoretical sampling was employed by recruiting people with MS who

were attending group aquatic exercise classes at the Burrswood Health and Wellbeing Centre. The data analysis from some of the initial participants also identified participant concerns related to difficulty in retaining the benefits of the programme and participating in regular physical activity. The concepts needing additional exploration were investigated by further theoretical sampling. The researcher identified and recruited people with MS who were not participating in any regular physical activity. As the study progressed the purposive sampling was gradually replaced by the theoretical sampling.

7.2.5. Sample Size

The number of participants required for a Grounded Theory study is contingent on the demands of theoretical saturation being met (Trotter, 2012). Based on the principles of Classic Grounded Theory research, saturation in this study was considered to have been achieved when there were no new concepts emerging from the subsequent data collections. Since the sample in Grounded Theory is based on the emerging concepts and the areas that need further exploration, it was not possible to propose a precise sample size at the beginning stages of this study. Given readings from other Grounded Theory studies a sample size of about fifteen participants was proposed during the research proposal stage. It was acknowledged at that stage that this assumption might prove to be inaccurate as the researcher did not have experience in the Grounded Theory. Hence the option to increase the number of participants was retained, should theoretical saturation not be achieved. It is generally acknowledged that the achievement of sampling saturation cannot be defined since any given study may expand and diversify. According to the Classic Grounded Theory approach, collecting a large amount of data that fails to add any new information would be a redundant exercise. But qualitative research produces large volumes of data, so seeking theoretical saturation was more important than the amount of data collected. This study achieved theoretical saturation after collecting data from 17 participants. Further details about the research participant's detail will be presented later in the Findings chapter (see section 8.1) of this thesis.

7.3 Recruitment

Burrswood Health and Wellbeing Centre was identified as a suitable site for locating and recruiting participants in this study. However, the researcher was not an employee of the

Centre and did not have necessary knowledge to identify potential participants. The Head of Department of Physiotherapy at the Burrswood Health and Wellbeing Centre acted as the official gatekeeper for this research and played a crucial role in the recruitment. The gatekeeper provided access to the hospital site, patient records and facilities. Because the gatekeeper was already working as a physiotherapist at the Centre she was in a better position to guide the researcher in the identification of suitable participants. Recruitment of sample for this study was completed in three steps: 1) Identifying potential participants, 2) Informing, and 3) Recruiting.

7.3.1 Identifying Potential Participants

The methods employed in identifying potential participants in this study can be explained in three stages. In the first stage a patient information day was identified as a suitable event to locate people with MS who had completed the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre. This event was recommended by the gatekeeper for this study. The information day was organised at the Centre and the event was planned in collaboration with the local MS Society branch. The main theme of the information day was the effects of aquatic physiotherapy for people with MS so the event was considered as a suitable platform for identifying potential participants. The event was attended by 35 people with MS. This stage was completed by using the principles of purposive sampling.

Analysis of the data collected from the first-stage participants guided subsequent sampling. This stage replaced purposive sampling with theoretical sampling. The potential participants who had been attending group exercise classes at the Centre were identified as suitable participants for exploring the emerging themes. Following the gatekeeper's suggestion, three aquatic exercise group classes were identified. Each group consisted of six to seven people with MS.

In the third stage, a theoretical sampling process guided the study in the direction of identifying people with MS who were not attending group exercise class at the hospital. To identify people who completed the aquatic physiotherapy programme and were not attending the exercise classes at the Centre, the gatekeeper provided the researcher with access to the hospital audit records of people with MS. The screening process identified 75 potential participants to whom letters of invitation were sent by post.

7.3.2 Informing

Potential participants were informed about the study through an invitation letter that provided basic information about the research. The letter explained the aim of the proposed research, the data collection methods, details about the researcher, the potential length of participation and the location of the data collection. The distribution of letters was completed in phases due to the transition of sampling methods from purposive to theoretical sampling. In the first stage letters were distributed at a patient information day organised at the Burrswood Health and Wellbeing Centre. In the second stage treating therapists and reception staff distributed letters to potential participants who were regularly attending group exercise classes at the Centre. In the third stage invitation letters to all potential participants were sent with an intention to recruit those who were not attending group exercise classes. The administrative staff at the Burrswood Health and Wellbeing Centre sent these letters through the hospital postal system. The invitation letters were also displayed on the physiotherapy department notice board and in the reception areas of the hospital. The letters were also handed to potential participants by the reception staff. Physiotherapists publicised the research by directing potential participants to the recruitment letters.

Even though the recruitment letters were sent to all potential participants, response at the initial stages was low. To increase the reachability and visibility of this research, approval was gained from the ethics committee to add further publicising measures to the study. The researcher provided brief information about the research on social media platforms (e.g. Twitter, Facebook) of the Centre and advertised the study through the hospital and MS Society communications. The research participants were also asked to signpost this study to other potential participants.

7.3.3 Recruiting

Participants who showed an interest in the study were asked to contact the researcher directly so a detailed participant information sheet (Appendix 2) and consent form (Appendix 3) could be provided to them. These were sent either by email or post. The researcher spoke to all potential participants by telephone to check their suitability for participation. 'Letter-to-a-friend' method participants were offered prepaid return envelopes in which to return their consent forms. The consent form of the interview participant was completed prior to the commencement of their individual interview.

a) Selection criteria

Recruitment to the study was based on the following inclusion and exclusion criteria. Suitability of potential participants and participation in the study were judged in three steps.

Step one: Once a patient had volunteered to participate they were contacted either by email or telephone. They were provided with a participant information sheet and a consent form. Before recruiting participants were asked about their understanding of the study. Their responses gave an idea on whether they had read and understood the information provided.

Step two: The researcher went through the selection criteria by telephone to obtain verbal confirmation from participants prior to their formal recruitment to the study. Inclusion and exclusion criteria were written in lay terms with the aim of making them self-explanatory and thereby facilitating self-evaluation by the participants themselves.

Step three: During interview the researcher was vigilant of any signs of distress and/or discomfort. When a participant became upset, the interview was paused and the interviewee was given a choice either to continue or cancel the interview and seek support from clinicians at the hospital. Of the 13 interview participants only one of them became upset during the interview. Participant chose to pause the interview for a short period and then the interview resumed upon her request.

b) Inclusion criteria

For the purpose of the current research “carry-over effects” were defined as “the effects of aquatic physiotherapy that are seen even after one month of the completion of therapy at the Burrswood Health and Wellbeing Centre”. Because there is no definitive guidance on the timeline that can be considered as the carry-over period, a one-month period was chosen for this research. MS patients who had completed a programme of six 1-to-1 aquatic physiotherapy sessions at the Burrswood Health and Wellbeing Centre more than a month before were considered suitable for recruitment.

Although MS can affect people at any age, it is usually diagnosed between the ages of 20 and 30 years (NHS, 2016). MS is rarely seen in people younger than 15 (Harvey, 2012). Considering the complexities involved in the recruitment of younger participants and MS being uncommon in younger age groups, it was deemed appropriate to recruit only people older than 18 years for this research.

The methods of data collection identified as suitable for this study were face-to-face, telephone and Skype/FaceTime interview, and writing a letter-to-a-friend. It was therefore important that participants had access to the necessary resources (e.g. internet, telephone, and computer) and that they be willing to use them for the purpose of this research. To participate in the interviews participants need to be available during working days between 9am and 7pm. A detailed account of these methods will be presented in the data collection section of this chapter.

c) Exclusion criteria

It was deemed appropriate to exclude participants who could not read or understand the participant information sheet that was written in English. People who cannot understand the information sheet would not be able to provide informed consent and so would not be eligible to participate in the research. It would have been possible to recruit participants who could seek support from a family member or carer to act as their translator for communication but this could limit participants' freedom to share information with the researcher. Non-English speakers were also excluded because the purpose of this qualitative study is to explore and better understand the perspectives of participant. Translations might not accurately represent the meaning as the participant had intended. Moreover, there were no dedicated funds for arranging a translator.

To provide data on the carry-over effects it was important for participants to be able to recollect these effects. This would become particularly challenging for people with cognitive problems. Some of these could impede their ability to focus and stay attentive during interview. For these reasons MS patients diagnosed with cognitive problems were excluded.

People suffering a relapse, emotional distress and/or who are medically unstable were not recruited to the study as their participation could have become unnecessarily burdensome for them.

Those who lacked capacity to consent were not included as this research could be completed by recruiting those who have a capacity to consent. Furthermore, this study did not have any intervention that might provide benefit to people without a capacity to consent, hence there was no justification for recruiting them (GMC, 2013).

People who were participating in parallel research at the time of this research were not recruited. This decision was made to reduce the research burden of participants being 'over-researched' (Clark, 2008) and thus prevent research fatigue.

Interviews were audio-recorded. It was important that participants sat and concentrated for the duration of the interviews.

As there were no dedicated funds for translation services, participants who cannot speak and communicate in English were excluded.

For a participant to be able to provide a letter-to-a-friend they had to be able to write or dictate. Because participants wrote letters in the absence of the researcher it was considered important that they be available via telephone for a debrief discussion during and after participation in this method. Patients who did not have access to a telephone or were not willing to telephone were excluded.

Because of the difficulties in the recruitment, the researcher later adopted two additional methods of data collection: Telephone and Skype/FaceTime interview. In addition to the above criteria, the below criteria was used for recruitment.

Additional criteria for Telephone interview:

Inclusion criteria:

Participants have access to

- UK based landline or mobile phone with free incoming calls
- quiet and private room for the length of the interview

Exclusion criteria:

Participants who

- cannot speak and understand verbal communication in English
- are not comfortable in audio recorded interview
- cannot concentrate for the duration of the interview

- have a poor telephone connection
- are not available for interview during the weekdays between 9am and 7pm

Additional criteria for Skype / FaceTime interview:

Inclusion criteria:

Participants who have access to

- Skype / FaceTime connection and able to use it
- quiet and private room for the length of the interview

Exclusion criteria:

Participants who

- cannot speak and understand verbal communication in English
- are not comfortable with Skype / FaceTime audio recorded interview
- cannot sit and concentrate for the duration of the interview
- have a poor internet connection
- are not available for interview during the weekdays between 9am and 7pm

7.4 Data collection

The data collected for this study were qualitative. Raw data were in the form of views and descriptions of personal experience expressed by people with MS who had completed the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre. Qualitative data can be obtained in a variety of ways. There are many methods available in practice and these can be broadly grouped as interview, observation, document and audio visual materials (Creswell, 2013). Interview is the most commonly used qualitative research method. In this, the researcher asks questions of the participant and the answers are recorded. Although a variety of methods could be deemed appropriate for this study, the researcher chose to employ the 'letter-to-a-friend' method (see section 7.4.1) and face-to-face, telephone, Skype/FaceTime interviews (see section 7.4.2). The following section will justify the choices made and describe the procedures implemented in this research.

7.4.1 Letter-to-a-friend

A letter, which is a popular form of a communication method, provides textual data. Letters are considered a suitable data collection method for qualitative studies. Letters elicited for the purpose of a prospective study are considered as elicited texts (Charmaz, 2014), while letters written in the past are reported as historical communications. Patton (2002) describes letters as a form of document data. Creswell (2013) also groups personal correspondence and historical letters under the category of document data collection methods.

Writing a letter-to-a-friend is a data collection method that is not frequently used in health sciences research. This method was first reported by Trigwell and Prosser (1991) and they used it as a form of student assessment method in a nursing course. The literature search for this method returned only a few publications. Two of these were from Psychology (Serpell, et al., 1999; 2002) and were written by the same primary author. Further discussion with qualitative researchers, communications with health sciences faculty at University of Brighton via email, and an extended literature search for other forms of letter-writing data collection methods produced a few more resources from the fields of Education, Clinical Psychology and Social Policy Research. The search did not identify any studies in Physiotherapy.

Correspondence has been used as a research method in Education. However, its use in health research is rare. A study completed in 2000 claimed the use of 'pen pal letters' in their study was a 'methodological innovation' (Kralik, Koch and Brady, 2000, p. 910) in nursing research. The study, described by the authors as "guided by feminist principles", explored the lives of women with chronic illness. The authors cited their opinions on the advantages and disadvantages of using letters as a primary data collection method. These will be discussed in detail while justifying the selection of the 'letter-to-a-friend' method as a suitable data collection method for the current doctoral study.

Kiern and Aunon (1990) used the letter to friend method as a mental task to measure the performance of electrical activity in the brain. The aim of their study was to find alternative communication strategies for people with severe physical disabilities. The content of the letters was not captured in the form of textual data and was not used for analysis. This study therefore could not aid understanding of the benefits of letters as a qualitative data collection method.

Participants in Serpell, et al's (1999; 2002) studies were asked to write two letters addressed to their own eating disorders, one regarding the eating disorder as a friend, the other as a foe. The textual response received in the form of letters was used as data. Serpell, et al. (1999) indicated that letter writing was part of the cognitive behavioural therapy programme that was already being used as a strategy in the management of eating disorders. The authors did not provide any valid rationale for choosing the letter writing as a primary data collection method for their research. Serpell, et al. (1999; 2002) also failed to report the advantages and disadvantages of this data collection method.

Rautio (2009) explored the views of villagers on the beauty of their surroundings. The study participants corresponded with both the researcher and each other. As reported by Rautio (2009), the topic of their study was not a sensitive matter, therefore it was not deemed necessary to maintain confidentiality between participants. However, participants in the current study were asked to provide information on the carry-over effects of aquatic physiotherapy on their health. During data collection participants disclosed sensitive information on their personal health in order to explain specific effects. For this reason, correspondence between participants was deemed inappropriate for this study.

Another qualitative study that compared the effects of two family interventions used letters as a primary data collection method (Whitney, et al., 2005). Participants were instructed to write letters as a therapeutic task and the letters were analysed by using the Grounded Theory approach. The study did not report any limitations of using letters as a data collection method. Although Whitney, et al. (2005) explained the therapeutic reasons for using the letter-writing task as a method, they failed to explain its benefits as a data collection method.

There were six main reasons for employing the 'letter-to-a-friend' data collection method in this study. These were fit, convenience, invisibility, reciprocation, themes for question and limiting preconceptions. The rest of this section will explain these.

a) Fit

There is evidence to indicate that letters are a suitable primary data collection method for conducting qualitative research (Serpell, et al., 1999; 2002; Whitney, et al., 2005; Harris, 2002; Rautio, 2009). In particular, the 'letter-to-a-friend' method was used in three

of the earlier studies that were designed on the principles of Grounded Theory approach (Serpell, et al., 1999; 2002; Whitney, et al., 2005). None of these studies reported any practical problems in using letters as a primary data collection method, which further strengthened its appropriateness for the Grounded Theory studies.

The distinctiveness of the Classic Grounded Theory approach is that any type of data can be used, that can contribute to answering the research question. This notion is supported by Glaser's (2007, p.1) statement:

“All is data” is a well known Glaser dictum. What does it mean? It means exactly what is going on in the research scene is the data, whatever the source, whether interview, observations, documents.”

As discussed at the beginning of this section, data collected from letters were categorised as documents (Patton, 2002; Creswell, 2013). The above statement by Glaser (2007) suggests that documents are a valid form of data for a Classic Grounded Theory study. Charmaz (2014) also suggested that elicited texts can generate data that have similar qualities to the data generated from an interview. Taking into the consideration of all the above views, the 'letter-to-a-friend' method was selected as a suitable data collection method in this research.

b) Convenience

Correspondence in the form of letters was used as a primary data collection method in Rautio's (2009) doctoral study. Rautio (2009) suggested that letters, unlike interviews, have the advantage of convenience. A participant can choose their own time and location for writing. The participant also has control of the pace and length of time they spend writing. The majority of people with MS depend on others for their mobility. Therefore, writing letters at home was deemed a convenient data collection method.

Responses given in interview, as distinct from a letter, are spontaneous and based on the ability of the participant to recollect events. If the questions are not focused on pertinent themes there is a chance the participant may not recall this particular concept. Alternatively, composing letters provides ample time for participants to think and explore relevant aspects before writing them.

In the letter-writing method, neither participant nor researcher is required to travel to a particular location. This research did not have any dedicated funds for arranging transport for the interview participants. So participants who could not arrange their own transport could still participate in this study by participating in the 'letter-to-a-friend' method.

c) Invisibility

The invisibility between the researcher and participant is a distinct advantage of the letter-writing method (Rautio, 2009). Neither the participant nor the researcher needs to know the other or meet in person while writing, reading or analysing the letters (Harris, 2002). This distinctive quality of letters was reported as a particularly helpful feature when recruiting participants. Qualitative studies aimed at exploring sensitive issues, such as self-harm and abuse, struggle to recruit participants for interview (Harris, 2002). Invisible methods such as correspondence and diaries were reported as alternative and sometimes preferable methods for exploring complex sensitive issues. Harris (2002) reported that the incorporation of letters in her study benefited the recruitment process and resulted in the recruitment of a sufficiently large sample.

Unlike Harris's (2002), the current study on the carry-over effects of aquatic physiotherapy was not intended to explore complex sensitive personal issues. But, participants might choose to disclose sensitive information on their health while describing the carry-over effects. The elicited texts, such as the letters used in this study, are considered beneficial (Charmaz, 2014) because participants have the opportunity to express their views more freely than interview without feeling constrained by the researcher's presence.

d) Reciprocation

Charmaz warned that elicited texts can be limited in their usefulness as the opportunity for the researcher to probe into the details of the responses is lacking (Charmaz, 2014). This limitation was reported as a problem with all types of single correspondence method and historical letters. This view was also echoed as an important limitation of the single response methods such as journals. This limitation was taken into account during the design of the current study and was addressed by asking participants to write a follow-

up letter. These provide the opportunity to check the themes that were emerging from the concurrent data collection and analysis. Harris (2002) and Rautio (2009) used multiple correspondences as part of their data collection method. Unlike Harris's (2002) and Rautio's (2009) studies, the current study did not engage in reciprocating correspondences. The study intended to collect a maximum two communications from each 'letter-to-a-friend' participant.

e) Developing Questions for interview

The data received from the letters helped in the development of pertinent questions for the first interview. The initial stage of recruitment resulted in two letter responses which were received within a few weeks. Before recruiting the first interview participant, the content of the letters was analysed by using the principles of Constant Comparative Analysis. A detailed account of this analysis will be presented in the data analysis section of this chapter. The initial analysis of the two letters helped in the identification of recurring concepts that needed further exploration. These concepts were subsequently used in the development of interview questions for the first interview. It was advantageous to start the data collection process with the letters as they provided pertinent concepts at an early stage, which could then be explored in-depth by using the flexibility of the interviews.

f) Limiting Preconceptions

The researcher has been associated with the MS Aqua Research Team (MSART) for over eight years. Although none of the MSART past research looked at the carry-over effects, during the reflections it surfaced that the researcher had preconceived ideas about the carry-over 'benefits' of aquatic physiotherapy. These ideas originated from researcher's own professional experience, conversations with patients, clinicians and assumptions that are unsubstantiated. As there was no prior research on the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy, it was difficult to prepare interview questions without being influenced by such knowledge. The researcher also did not have experience in conducting in-depth interviews.

The interview method provides an opportunity to explore the research topic and if the relevant questions were not asked during the interview then it would become a missed opportunity. The researcher was anxious about missing the opportunity to explore relevant concepts. As the researcher is a novice, there was a danger that he might steer

the interview towards his preconceived ideas. The invisibility between the researcher and participant in the 'letter-to-a-friend' method meant that the influence of researcher's preconceived ideas on participant responses was limited. The Constant Comparison Analysis helped the researcher to be close to the raw data that were essentially provided by the participants themselves. The emerging themes from the analysis reduced the impact of researcher's preconceived ideas. The decision to start the data collection with the letters was crucial in limiting the influence of researcher's preconceived ideas on the research.

g) Implementation

During the proposal stage, the letter-to-a-friend method was planned as a data-collection method parallel to interview. This meant the first participant in the study could participate either in an interview or the letter-to-a-friend method. There was no evidence to suggest the benefits of beginning the data collection with either method. However, prior to the commencement of the recruitment process the initial plan was modified and volunteers interested in participating in the letter-to-a-friend method were recruited as the first set of participants. This decision was made during discussion with supervisors, who have experience in the Grounded Theory approaches. The decision to start the data collection with the 'letter-to-a-friend' method instead of interview proved beneficial in developing themes for the interview questions and limiting the preconceived ideas of the researcher.

Table 3 provides a summary of sequential steps implemented in the 'letter-to-a-friend' method. Participants were asked to write a letter as a reply to a request from a virtual friend. The virtual friend request was generated by the researcher. The request contained questions concerning their MS and the carry-over effects of a programme of six 1-to-1 aquatic physiotherapy sessions they had undertaken at the Burrswood Health and Wellbeing Centre. They were given the choice of either typing, writing or dictating letters. Participants were given the opportunity to choose any one of these methods according to their ability, preference and convenience.

Letter-to-a-friend method	
Stages	Step by step procedure
1. Before participation	<p>1. Recruitment letter</p> <p>2. Participant contacted researcher</p> <p>3. Telephone conversation + Participant information sheet + consent form explaining the aim, procedure, checking the suitability and informing of the counselling support</p> <p>4. Participant posted a signed consent form to the researcher</p>
2. Participation in the 'Letter-to-a-friend' method	<p>5. Researcher sent a letter purporting to come from a friend</p> <p>6. Participant completed letter-to-a-friend method</p> <p>7. Researcher received a reply from participant</p> <p>(Researcher was available to answer any query and could be contacted by telephone)</p>
3. After participation	<p>8. Telephone debrief, and researcher answered any further queries</p> <p>9. Researcher explained to participant the possibility of second letter with specific aspects that might require further exploration</p>

Table 3: Summary of letter-to-a-friend method

7.4.2 Interview

Interview was used as an additional data collection method. The beginning of this section will provide an overview of different interview data collection methods and the reasons for the selection of face-to-face, telephone and Skype/FaceTime interviews. The latter part of this section will provide a detailed account of the implementation of these methods.

During the initial stages of planning the study proposed the 'letter-to-a-friend' as the only data collection method. However, interview was added as an additional data collection method for the following reasons. During the planning stages, the researcher had discussed with the Physiotherapy manager of the Burrswood Health and Wellbeing Centre the suitability of the 'letter-to-a-friend' data collection method for people with MS who were attending aquatic physiotherapy service. The manager indicated that the majority of potential participants were severely disabled and might not be able to participate in a demanding task such as writing and dictation. To ensure the study could provide an opportunity for participation to people of varying ability, and to increase the chance of recruiting more participants, it was decided to add interviews. Data generated by using multiple methods is suitable for the Classic Grounded Theory research and using more than one method improves the quality of a flexible qualitative design (Robson, 2011). For the above reasons additional method of data collection in the form of interview was added to the study.

"Interview" in the qualitative research is defined as:

"a data collection method in which an interviewer asks questions of a research participant, either face-to-face or by telephone" (Polit and Beck, 2014, p.731).

Interview can provide a deeper insight into the phenomenon under investigation than is provided by other qualitative methods because they can generate rich data from research participants (Gelling, 2015). Interview helps the researcher to obtain subjective views of the participants that could be used for interpreting the meaning of the phenomenon under investigation (Brinkmann and Kvale, 2015). Although the type of methodological approach for the qualitative study dictates the selection of a particular

interview style, all qualitative studies can use interviews as the primary method of data collection (Polit and Beck, 2014).

Focus groups and individual interviews are the some of the most commonly used qualitative research data collection methods (Creswell, 2013). A focus group is a form of qualitative data collection method which involves interviewing a group of people. Although discussion in the focus group is moderated by a researcher, participants' responses can be limited by the influence of group dynamics. Some participants may become anxious about interacting with others. Some may be unable to reject the dominant view due to a fear of creating conflict and may not be able to disclose certain views due to a fear of being isolated by others. Participants' responses in a focus group can be driven towards usual expectations and socially desirable answers. For these reasons a focus group is not considered a suitable method for research study that seeks an in-depth understanding of a phenomenon and for finding unanticipated information (Acocella, 2012). Therefore, focus group data collection was deemed an unsuitable method for the proposed doctoral study, leaving the option of individual Interview.

Individual interview can be conducted either face-to-face, on the telephone or by electronic means (Opdenakker, 2006) including Skype, FaceTime, messenger, email, social networking or video conference. Face-to-face interview requires the interviewer and interviewee to travel and meet at a prior agreed location. To improve flexibility for participants and to decrease the burden of transport issues surrounding participation, the telephone and Skype/FaceTime interviews were added at a later date.

Interviewing provides an opportunity to question on a focused area and to conduct an in-depth inquiry (Charmaz, 2014). According to Charmaz (2014) interviewing allows time for the participant to interact with the interviewer, to think about the questions in a relaxed environment, and thereby allows time for new ideas to emerge. Interviews can encourage participants to revisit discourses that would encourage them to understand and express their situation from a new perspective. The flexibility of interviewing allows the researcher to lead discussion towards emerging ideas and revisit areas needing further exploration. Interviewing is one of the supported data collection method in the Grounded Theory research (Creswell, 2013). Glaser and Strauss's original study (1965), *Awareness of Dying*, used interviews as one of the primary data collection methods. Given its advantages and suitability, individual interview was considered the most appropriate method for collecting data for this research and was implemented.

a) Semi-structured interview

Interviews can be classified as unstructured, semi-structured or structured, depending on the degree of flexibility built into them. Some scholars argue that there is no such thing as an unstructured interview (Gelling, 2016) and some prefer to use the term 'less structured interview' (DiCicco-Bloom and Crabtree, 2006). The major difference between a structured and less structured interview is the style of research questions asked. Structured interviews often use closed interview questions, suitable for gathering quantitative data (DiCicco-Bloom and Crabtree, 2006; Whiting, 2008). Structured interview is best suited to testing hypotheses in a field where there is some theoretical knowledge. The characteristics of the structured interview is not suitable for achieving the inductive reasoning of this study and the principles of the Classic Grounded Theory. Accordingly, it was deemed unsuitable. Least structured interview is suitable for ethnographic studies because data are collected through observation, field notes and guided discussion.

Semi-structured interviews were conducted in this research. They have the flexibility to modify questions as concepts emerged and so to develop new questions during the interview process (Mitchell, 2015). This flexibility facilitated in-depth inquiry of the concepts that needed further exploration. This in-depth inquiry subsequently assisted the emergence of new ideas (Nicholls, 2009). Even though semi-structured interview offers flexibility, it also kept the focus of discussion within the confines of the research topic (Mitchell, 2015). An interview schedule prepared for this study prevented the questions from directing or leading discussion towards preconceived ideas or unrelated topics (Oppdenakker, 2006). The semi-structured interviews of this study used open-ended questions which allowed participants to explore and share their experiences.

b) Implementation

The face-to-face interviews were conducted in a quiet room at the Burrswood Health and Wellbeing Centre. The telephone and Skype/FaceTime interviews took place between the patient's home and researcher's office. Face-to-face interviews at participants' homes were not considered suitable due to the complexities of the ethical issues and the influence of power dynamics between the interviewer and interviewee. The interviews

were organised at a time and date that was mutually convenient for participant and researcher.

The interviews were recorded using a digital audio recording device (Sony Digital dictation machine: ICD-PX333D) which helped the researcher to focus on the discussion and transcribe the recordings accurately at a later date (Opdenakker, 2006). Table 4 shows the steps that were taken in the interview methods of this study.

Glaser and Strauss (1967) suggest Grounded Theory researchers refrain from using audio recording devices, and instead they recommend the use of field notes. Glaser and Strauss (1967) were primarily concerned about the interviewer spending too much time on transcription and worrying about the accuracy of information given by participants rather than focusing on the developing theory. However, it was decided to record the interviews as the researcher is a novice who does not yet have sufficient experience in writing field notes and who is concerned about missing important points and forgetting their inclusion in the development of the theory. This decision was also implicitly supported by the work of Stern (2007), who argues that due to the demand from funding bodies and research ethics committees, research students are obliged to record interviews. According to Stern (2007), when a researcher is focused on the developing theory they are able to glean the essential information necessary to the development of theory rather than focussing on other basic generic information. This study, heeding the concerns expressed by Glaser and Strauss (1967), did not devote too much time or energy to checking the accuracy of what was said and instead focused on the essential information necessary to the aim.

Interview method	
Stages	Step by step procedure
1. Pre-interview	<p>1. Introduction and establishing rapport</p> <p>2. Researcher provided a brief overview of the purpose of the study and procedure implemented.</p> <p>3. Checked whether the participant had any questions about the study, the participant information sheet and the procedure of the interview.</p> <p>4. Reassured them about confidentiality and their right to withdraw.</p> <p>5. Checked whether the participant was feeling alright to participate in the interview and informed them about the availability of counselling support.</p> <p>6. Researcher received participant consent before starting the audio recorder.</p>
2. During the interview	<p>7. Started the interview with generic questions. Building rapport was the primary intention.</p> <p>8. Exploratory phase - more in-depth questions</p> <p>9. Co-operative phase - shared information</p> <p>10. Participatory phase</p>
3. Post-interview	<p>11. Debrief - Researcher provided an overview of the key points discussed</p> <p>12. Asked participants whether they were feeling alright.</p> <p>13. Concluded</p>

Table 4: Summary of interview method

7.4.3 Questions

To develop new knowledge, it is imperative to reduce the influence of the researcher's preconceived ideas. Therefore, the questions used in the initial stages were broad and did not direct the participant towards any specific areas. These questions are referred to in the literature as 'grand tour' questions.

The following are examples of the grand tour questions used at the initial stages of this research

- How would you describe the carry-over effects of aquatic physiotherapy?
- How useful have these been in your daily life? (Where possible please provide examples of the benefits).

Data collection in the Grounded Theory research should avoid forcing data generation towards preconceived ideas of extant knowledge (Glaser, 2014). Classic Grounded Theory research principles advocate that questions used during data collection must not direct participants towards the preconceived ideas of the researcher. For these reasons the researcher did not have many questions at the start. The initial questions were developed using the notion of sensitising concepts (Blumer, 1969). The researcher developed the initial questions from the generic knowledge gained from professional experience. The researcher also used the initial 'letters to a friend' responses to develop questions for the initial interviews. Although some of the generic information questions were of the closed type, the main questions that focused on the aim of the study were open-ended. The analysis led the researcher to find gaps in the data, to look for emergence of pattern, and identified the areas that needed further exploration. Analysis helped to develop new interview questions and to identify the sample that was appropriate for future data collection and thus also helped with the process of theoretical sampling (Glaser and Holton, 2004). The subsequent questions were developed from these new emerging concepts. The researcher developed the subsequent interview questions without forcing the data towards any preconceived ideas and assumptions.

7.5 Data Analysis

7.5.1 Transcription

The data received in email communication was readily available in the form of text. The audio- recorded interviews were transcribed verbatim. The first seven interviews were transcribed by the researcher and the rest by using a confidential transcription service.

7.5.2 Data organisation

Recent advances in computer technology have provided opportunities for qualitative researchers to use Computer Assisted Qualitative Data Analysis Software (CAQDAS). Although there are concerns about the influence of CAQDAS on results, the popularity of their use in qualitative research designs is increasing (Hutchinson, 2010). Software is more efficient than manual techniques in storing, sorting, retrieving and organising large amounts of qualitative data (Bringer, Johnston and Brackenridge. 2004). Grounded Theory is one of the complex methodologies (Gelling, 2011). Because the researcher is new to the Grounded Theory and bearing in mind its complexity, it was decided at the outset that careful planning and organisation of the data would be essential. To help with this and to demonstrate scientific rigour in data analysis, a Computer Assisted Qualitative Data Analysis Software (CAQDAS) was integrated into the study. While there are different types of CAQDAS packages available, QSR international NVivo software package (versions 10-12) was selected.

7.5.3 NVivo

There were two main reasons for the selection of NVivo. The primary reason was theoretical and the secondary was practical. Of the two the more important was theoretical: the software's fitness and suitability for the Grounded Theory (Cope, 2004). There is adequate evidence to indicate that NVivo was used successfully in previous Grounded Theory studies (Woods, et al. 2015). Once fitness and suitability were checked, the following secondary reasons were considered. NVivo was readily available for use on the Anglia Ruskin University and work computers of the researcher. Anglia Ruskin offered training and tutorials in the use of NVivo as part of their research student training programme. Finally, colleagues and doctoral research students at the

researcher's work place were using NVivo for their research and were available for peer guidance and support.

The textual data from the letters and transcripts were uploaded to NVivo. The software was helpful in navigating vast amounts of data and enabled the researcher to focus on discovering themes and connections (Cope, 2004). The functionality of the software enabled the researcher to follow the procedures in a clear, step-by-step manner which was helpful for the Constant Comparative Analysis. The above features were helpful in showing transparency in the analysis and improving the scientific rigour necessary for quality assurance (Bringer, Johnston and Brackenridge, 2004).

7.5.4 Constant Comparative Analysis

Constant Comparative Analysis is a key tenet of Grounded Theory research (Becker, 1993; Birks and Mills, 2015) and was therefore incorporated in this study. This section will provide a detailed account of the Constant Comparative Analytical procedures implemented. The section begins with an overview of the qualitative data analysis procedures and the reasons for the choice of the Grounded Theory approach analysis for this study. The later part of this section will provide a detailed account of the Constant Comparative Analysis with some examples. This section is organised into five subsections: coding, substantive code, core category, theoretical code and memo writing. Different Grounded Theory approaches use different terminology to describe their analysis. To avoid confusion, during the initial stages of this study it was decided to adhere to the terminology and to implement procedures described by Glaser and Strauss (1978).

According to Glaser and Strauss, inductive qualitative data analysis approaches can be broadly divided into three categories: unsystematic reading, overall grounding and Grounded Theory (Glaser and Strauss, 1978). In the first approach the analyst performs unsystematic reading of the data and develops a common-sense theoretical view of it. In this approach, there is risk of researcher bias because a theoretical view is influenced by the researcher's preconceived ideas and made up of the specific concepts that appeal to him (Glaser and Strauss, 1978). This level of bias posed by this approach would limit the generation of new concepts that would eventually defeat the main purpose of the current study. Unsystematic reading also lacks step-by-step detail in the analysis and is

therefore limited in demonstrating scientific rigour (Glaser and Strauss, 1978). For these reasons unsystematic reading was not suitable for this study. The second type of analysis is an overall grounding approach. In this a few concepts are developed systematically at the beginning and the rest of the data are organised under a few categories. Because of these early conclusions some of the later data can be forced into these few categories and remotely connected to them (Glaser and Strauss, 1978). This approach also limits the development of new categories and expansion of theory. Accordingly this approach was also discarded. Unlike the first two approaches, the Grounded Theory approach implements a systematic and sequential analysis that compares incoming new data with the previously collected data (Glaser and Strauss, 1978). The Constant Comparative Analysis compares incidents in the data, identifies latent patterns, generates new codes, categories and eventually a new conceptual framework. The incoming data merges with the existing codes and modifies them so that they best fit. These unique features of the Classic Grounded Theory analysis were apt for achieving the main objectives of the current study.

Gerunds were used to name the codes, categories and core category. Gerunds are a form of word expressions in English Grammar. Although Gerunds resemble the present participle verbs with an '-ing' at the end, Gerunds are used as verbs embedded within in a clause and the clause forms as a noun for a larger sentence. GT approaches recommend the use of Gerunds for coding and categorising the data (Charmaz, 2012). Gerunds are adept for expressing an abstract concept that is not constrained by time, place and context (Glaser, 1996). Gerunds express an ongoing action and process hence they are more suitable for using as code and categories.

The data analysis used in the current study was a combination of inductive and deductive reasoning procedures. Deductive reasoning was implemented to look for the latent patterns, groups and characteristics of people who would be most suitable to achieve the saturation of emerging concepts. The emerging theory was deduced into hypothesis, possibilities and probabilities by using conceptual elaborations. These hypotheses helped in the identification of areas that needed further explanation and elaboration. The deductive process was only used for the contribution of emerging theory and was helpful in understanding where to find the new data and theoretical sampling.

a) Coding

Coding is one of the key procedures of Constant Comparative Analysis (Holton, 2010). Different types of Grounded Theory approach employ various types of coding method.

The current study generated two main types of code by employing the coding procedures recommended by the Classic Grounded Theory approach. These are substantive and theoretical codes (Holton, 2010; Holton and Walsh, 2017). While substantive codes are developed directly from the data, theoretical codes are conceptualised from the analysis of the substantive codes. The coding process involved three steps (Birks and Mills, 2015; Holton and Walsh, 2017): 1) Open coding, 2) Selective coding, 3) Theoretical coding.

Open coding started with breaking the textual data collected from the initial letters into smaller concepts. These initial emerging concepts were considered to be incidents. Constant Comparative Analysis compared the data by going forwards and backwards in the data to look for similarities and differences (Holton and Walsh, 2017). Incidents that were similar in their properties were grouped together and later abstracted into substantive codes with the help of memos. Some of the incidents that represented more than one property were allocated to more codes, depending on their relevance. The below Table 5 provides an overview of the steps involved in this process.

1.Textual data	2.Incidence	3.Concept	4. Substantive code
Memo Writing			

Table 5: Steps in open coding

The data were analysed by constantly comparing incidences with incidences, incidences with concepts, concepts with substantive codes. The line by line coding of the subsequent participant's raw data was checked for incidences and concepts that were similar to those identified in the preceding participants' raw data. For example, the emergence of the concept of *'improved ability to balance during the functional activities'* was identified in participant 2 data as relevant by comparing it with the incidences of participant 1. Because participant 2 data also represented the same concept, the Constant Comparative Analysis validated the emergence of a pattern and identification of a substantive code that needed further exploration. The Constant Comparative Analysis compared and checked the concept with the substantive code emerging from the data analysis.

This emergence of code guided the implementation of the theoretical sampling. Further analysis and abstraction of the substantive codes elevated the codes into a category that

explained the latent pattern of behaviour. Memo writing led to the emergence of hypotheses which led to the implementation of the intermediate coding procedure in the data collection. This resulted in the selective questioning and coding.

Open coding prevented the likelihood of data collection being influenced by preconceived knowledge. Open coding started with the development of codes based on the incidences. Incidents that fitted with the codes were added as the study progressed. Incidents that did not fit at the initial stages were kept aside for developing new codes at a later stage, while irrelevant incidents were discarded. Open coding helped the researcher to conceptualise the concepts that needed further exploration and to identify the sample suitable for theoretical sampling. This process helped the researcher to identify relevant concepts and maintain the focus on the emerging concepts.

During the coding process, the following questions were asked (Glaser, 1978, p.57):

- *“What is this data a study of?”*
- *“What category does this incident indicate?”*
- *“What category or property of a category, or what part of the emerging theory, does this incident indicate?”*

Codes generated by using the above guidance were examined for similarities and differences and those relevant were linked to each other.

The researcher also asked consistently:

- *“What is actually happening in the data?”*
- *“What accounts for the basic problem and process?”*

These questions helped to maintain the focus of the analysis during data collection, the analysis and coding stages in looking for latent patterns in the incidents that developed codes. These eventually developed the categories. The analysis of the data line-by-line (Glaser, 1978; 1992) ensured full coverage of the data and helped in developing the theory that is well grounded in the data. Alternatively, an overview approach would give a quick overview of the data, which could lead to a thin theory. The line-by-line coding was used to avoid missing any relevant categories and not to become too favoured towards a ‘pet theme’ (Glaser, 1978; 1992).

The researcher did not assume the relevance of any variable at the start such as age, sex, type of MS. The researcher did not lead the data collection and analysis in light of these prior assumptions. If these variables emerged as part of data analysis, then these aspects were considered. Open coding at the start rapidly generated numerous codes but the researcher was aware that these codes required trimming to 'fit' with the emerging codes. At this stage the researcher did not rush in to developing the selective codes. Each concept was verified and corrected until concept saturation was achieved and a substantive code identified. Once the core concepts were identified the researcher started applying selective coding.

Grounded Theory is a 'multi-indicator concept' (Glaser, 1978. P.65). The constant comparison analysis compared indicator with indicator and then each indicator with the concept. The researcher conceptualised the similarities and differences between indicators which eventually helped in the generation of concepts, categories and their properties. The concept indicators model required the researcher to refer back to the codes and compare them with the developing codes. At later stages of analysis the degree of recollection required challenged the memory of the researcher. The use of NVivo software and Excel sheet were helpful and eased the process of referring quickly to the previous codes.

b) Categories and Core Category

Theory will be based on the core category (Holton and Walsh, 2017). Consequently identification of the categories and core category are some of the most important steps in the Classic Grounded Theory (Holton and Walsh, 2017). When a core category is compared with other categories it must be related to the majority of the categories and assume central position in explaining the pattern of behaviour. During data analysis a core category appears frequently and consistently. Due to these frequent appearances it takes more time to saturate than other less frequent categories. Core categories are variable and will not cause dead ends in the analysis process. Due to their variability the substantive core categories can easily fit with much larger formal theory studies. This research generated three categories: *Realising Potential*, *Positive Attitude and Enabling*; one core category: *Empowering*. The findings and discussion chapters will provide detailed discussion about these.

c) Theoretical code

The final step of coding is called theoretical coding (Holton and Walsh, 2017). Theoretical code was conceptualised from the substantive codes and core categories. Theoretical codes would make links between the substantive codes which would help in developing hypotheses. Although the substantive codes were the first to be developed, both coding processes will run simultaneously and this process will be clarified in the memos. Data and theory will be connected by the codes that were conceptualised during the analysis. By following this process the researcher distanced himself from the data and developed abstract understanding. Conceptually developed theoretical codes would help to develop theory that explains the process. Theoretical codes explicates relationship among core category and other related concepts (Holton and Walsh, 2017).

This research found two theoretical codes: *Facilitating factor and Deterring factor*. The findings chapter will provide detailed information about these. Theoretical codes were developed from the conceptualisation of core category, pattern of physical activity behaviour of the research participants and understanding the relationship between them. Because theoretical codes were developed directly from the substantive codes they were grounded in the data. There are several advantages to theoretical codes. They helped the researcher to conceptualise the relationship between the pertinent concepts. They ensured the researcher did not return to the raw data and waste time in the analysis. Theoretical coding helped critically to evaluate the completed work and enabled checking for any missing key concepts.

d) Memo writing

Memo writing is an important step in the Grounded Theory method (Glaser, 1978; Bryant, 2017). Memos helped to bring out abstract concepts from the data. Memoing continued throughout the implementation of the Classic Grounded Theory. It helped the researcher remember the important ideas before moving to the next set. The main goal of memos was to generate ideas. Organisation of memos lead to a memo fund which is like a bank of memos. Memos were also helpful at the secondary literature review integration stage where the emerging concepts were linked to the existing theory. Memos are an important tool of Constant Comparative Analysis (Holton and Walsh, 2017). Their use enabled comparison of the categories for similarities and differences. They helped to develop the reasoning behind their fit and relevance. They helped the researcher to focus on the emerging theory rather than description of events, avoid being deviated by his preconceived ideas and hypotheses. Memos during analysis led the researcher to find gaps in the data and identified areas that needed further exploration. They helped in the

development of new interview questions and identified the sample appropriate to future data collection, thus helped with the process of theoretical sampling.

As the memos progressed into concepts and their relationships, the researcher could conceptualise the process which was necessary to the generation of theory. Old memos were absorbed into new and this continued throughout. At a later stage memos became part of the data. They were kept separate from data. However NVivo provided a tracking mechanism in the analysis to trace the data that initiated the idea. This was a very helpful process in checking and counterchecking the development to ensure that the emerging ideas were grounded in the data. While writing a memo on a topic if a new idea emerged the researcher noted this on a new note and this new idea was written as a separate memo. The researcher planned and paced carefully so that the memo writing process was not interrupted nor ideas lost.

At times the researcher stopped data collection and analysis to write memos. When the researcher experienced a writing block he generated a memo by forcing his ideas through writing about a code. This led to the development of new ideas. The researcher was flexible in modifying earlier memos as new ideas emerged. If more memos related to different codes, then the researcher looked for similarities and differences between codes and saw whether they could be merged into one. The researcher kept the memos open as much as possible to allow diversity. Memo writing was not included in the substantive codes as this process would limit the emergence of new ideas. If two memos needed to be written the researcher did not write them together as the ideas could become muddled, resulting in a loss of clarity. The researcher indicated 'saturation' when he reached this on a particular category. Memos in this Grounded Theory were not aimed at description but conceptual abstraction.

The following sample memos explicate the processes adopted in the conceptualisation of codes and categories.

Analytical memo:

Amanda used the words “positive frame of mind” – (Researcher: *What does this datum mean?*). A dictionary defines ‘frame of mind’ as a person’s state of mood, which is the reason for having a particular attitude towards different things. Amanda indicated that her “positive frame of mind” towards the following day was the result of attending an aquatic physiotherapy session.

(Researcher: *Does this datum suggest influence of an aquatic physiotherapy session on Amanda's attitude?*). Amanda felt the aquatic programme made her feel that she was able to do something to fight against her Multiple Sclerosis and attributed to this feeling of ability as the reason for developing a positive attitude towards the next day. The datum in this instance is interpretative because it was the subjective interpretation of Amanda's perspective on the benefits (Researcher: *Does the change in attitude relate to Amanda's personality and her positive approach to dealing with problems in life? Or does aquatic physiotherapy positively influence patients' attitude towards their MS?*).

When the concept of the benefits in attitude first appeared in the data analysis, I was hesitant to believe that these benefits were the result of aquatic physiotherapy. During reflection I explored the reasons for this hesitancy and realised that it was based on my presumptions about what is possible and impossible in people living with long-term Neurological conditions. Attitudes and beliefs were rooted in my preconceived knowledge which perhaps were the result of my assumptions about the limits of the aquatic physiotherapy programme in this population. This steered to a conflict between my preconceived knowledge and what was being observed from the abstraction of the data. At this point of data analysis the uniqueness of Classic Grounded Theory's Constant Comparative Analysis was evident. The procedures were instrumental in resolving the conflict and guiding the future direction of data analysis. This process was helpful in leading the discovery of concepts, codes and saturation of subsequent codes. The stringent procedures of the Classic Grounded Theory made me follow the indicators in the raw data and look for properties that were helpful for identifying and saturating the concept, while carefully keeping aside my presumptions. The Constant Comparative Analysis and memos helped in the development of new hypotheses that required further exploration. This meant I started developing new questions exploring the influence of aquatic physiotherapy intervention on patients' attitude.

The questions developed from the memos contributed to further exploration of the concepts 'feeling positive', 'feeling able' and 'changing attitude' as the carry-over effects of the aquatic physiotherapy programme. Further data collection and iterative analysis emerged '*developing positive attitude*' as a pattern of behaviour that supported the generation of a category: '*Positive Attitude*'. A detailed account of this category, and its supporting codes and relevant participants' quotes from the data are presented in the Findings chapter of this thesis (See section 8.2.2.)

7.6 Scientific Rigour

The scientific rigour was considered throughout the planning and conduct of this study. The eight methods recommended by Chiovitti and Piran (2003) were implemented in this study to ensure scientific rigour. This study used four methods to improve credibility (see section 7.6.1), two for auditability (see section 7.6.2) and two for fittingness (see section 7.6.3).

7.6.1 Credibility

Method 1: The inquiry process was guided by participants' responses. Questions used in the early stage of study were "grand tour". The responses from the first few participants were used to develop questions for the interview of subsequent participants.

Method 2: The study incorporated field notes and noted the key words used by participants during interview. These words were used in developing the subsequent questions in order to check whether the developing theory was being constructed on the participant's intended meaning. Codes developed from the participants' responses were used in developing the subsequent interview questions and were checked by direct questioning of subsequent participants. This process helped to check the credibility of the concept against participants' meanings.

Method 3: In addition to the above, every interview was analysed prior to the planning of the next data collection. The data analysis was performed to identify new codes that needed further exploration. Where appropriate, the actual words mentioned by participants were used in the development of codes (in vivo codes). These codes were used in developing the questions for the subsequent interview. The new emerging codes from the participants' interviews guided the inquiry process, which adds credibility.

Method 4: Although there were only a few quantitative follow-up studies on the effects of aquatic physiotherapy programme in people with MS, during informal meetings, clinicians and patients at Burrswood Health and Wellbeing Centre suggested that they believed there were carry-over benefits of aquatic physiotherapy. Even though these

beliefs were not researched and substantiated, the researcher came to the study with preconceived assumptions that there would be carry-over effects of aquatic physiotherapy. However, the researcher was not sure what these effects might be, and on what type of MS problem, for whom, and how and why these would influence the daily life of people with MS. To minimise the influence of any preconceived assumptions on the results of the study, the study implemented three strategies. The researcher recorded memos immediately after the interview detailing his views about the data that emerged during the interview. The researcher also recorded his reaction to the interview answers. And the researcher kept a reflective journal recording his views on the carry-over effects of aquatic physiotherapy. By adhering to these three strategies, the researcher acknowledged his own assumptions and views and so consciously attempted not to let them influence the responses of the participants and the final results.

7.6.2 Auditability

The study used selection criteria and specified participants suitable for the study. The study also used NVivo data analysis software that was helpful for tracing the links between codes and categories their associations with the incidences from the raw data.

7.6.3 Fittingness

The study delineated the scope of research and applicability of the theory to other samples and settings. The study incorporated literature and explained the relevance and fit of the emerging theory to the existing knowledge.

To minimise the influence of professional power over participants, the researcher was not involved in delivering the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre. The researcher did not have any contact with the participants before their recruitment into the study. Potential researcher bias was not ignored in this study. On the contrary, writing memos about the researcher's bias helped the researcher not to dilute the emerging theory (Breckenridge, et al., 2012). The possibility of researcher bias was considered throughout. In addition to the above eight methods, reflexivity was used to improve the quality and scientific rigour of the study.

7.6.4 Reflexivity

Open coding helped the researcher to keep a distance from the data to see the abstract concepts. This process was enhanced by using the principles of reflexivity. Reflexivity is the process of self-reflection by which a researcher recognises the implicit and explicit factors that could influence the research (Engward and Davis, 2015). Reflexivity was used to improve the transparency and robustness of this research. The following section will provide an example to explain how reflexivity was employed in this study. This section is written in the first person to fit with the academic practice of reflection.

I am an active member of Multiple Sclerosis Aqua Research Team (MSART) and have supervised research projects on MS in the past eight years. MSART completed various quantitative and qualitative studies which focused on the immediate effects of the Burrswood Health and Wellbeing Centre's aquatic physiotherapy programme on the fatigue, health-related quality of life, balance and gait of people with MS. The studies completed so far have found that aquatic physiotherapy is beneficial for these problems. Thus, I am not completely novice to the field of MS and aquatic physiotherapy research. If I were to formulate research questions for a study other than Classic Grounded Theory research I would have prepared questions that are capable of leading the research participant towards specific concepts with which I am familiar. For example, to measure the effects of an intervention I would have prepared questions covering topics such as pain, mobility, fatigue, balance, health-related quality of life, spasticity, contractures, sensory problems, deformities, the ability to perform activities of daily living, and the participation in and influence of an intervention on the progression of the condition.

The reflexivity helped me to become self-aware of these preconceived ideas and to question my assumptions about the carry-over effects (Engward and Davis, 2015). Reflexivity helped me to develop the initial questions as broadly as possible so they did not lead the research participant towards my preconceptions. Although staunch Grounded Theorists suggested that preconceptions and researcher knowledge are not important, the initial questions could be developed from preconceived ideas and this could limit the topics that needed exploration. If a qualitative research study cannot explore new areas then it would be limited in creating new knowledge. So it was very important to prepare the initial questions as "grand tour" questions without going into specific aspects. Therefore reflexivity helped me to become aware of preconceptions and delimit their influence on the development of questions and thus emergence of new knowledge.

7.7 Summary of methods

This chapter has provided information on and justification for the methods applied in this study. The aim of the study is to explore, better understand and explain the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. A qualitative research design incorporating inductive reasoning methods based on Classic Grounded Theory methodology was selected as appropriate to achieving this aim. People with MS who had completed the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre were identified as potential participants. The head of the department of Physiotherapy of Burrswood Health and Wellbeing Centre acted as a gatekeeper during the recruitment phases of the study. The gatekeeper provided access to the site and guided the researcher in identifying and recruiting suitable participants. Non-probability sampling methods were implemented as they were suitable to completing a qualitative study such as this. Two types of non-probability sampling method were employed. A purposive sampling method was employed during the initial stage of this study. This method was replaced by a theoretical sampling method during the later stages. The emerging concepts guided the subsequent theoretical sampling based on the principles of Classic Grounded Theory approach. Two data collection methods were implemented. These were letter-to-a-friend and interview. Three types of interview method were used: face-to-face, telephone and Skype/FaceTime. Interviews were planned as semi-structured. NVivo software was used to organise the data. Constant Comparative Analysis was implemented as an iterative process which developed concepts, substantive codes, categories, core category and theoretical codes. Memo writing was used for conceptual abstraction and identifying patterns. Ethical requirements were met by implementing the seven principles of ethics. Scientific rigour was maintained throughout the planning and implementation of the study by adhering to the principles of credibility, auditability, fittingness and reflexivity.

Chapter 8

Findings

Chapter 8: Findings

This chapter presents the research findings of a qualitative study exploring the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. They will thus be presented with a primary focus on the carry-over effects. The chapter is divided into four sections, introduced in the following order: participants' details, categories, core category, theoretical codes and conceptual framework. The categories section presents three categories: *Realising Potential*, *Positive Attitude and Enabling*. The core category section presents '*Empowering*' and its association with the categories. The core category section also presents two theoretical codes: '*facilitating factors*' and '*detering factors*'. During the data analysis and generation of findings, a deliberate decision was made to limit / minimise the influence of the established evidence or theories on the emerging concepts. Accordingly, this chapter will not discuss or integrate the existing literature. A detailed integration of the relevant, existing evidence will be presented in the Discussion chapter of this thesis.

Relevant excerpts from research participants' interviews and letters are used in this chapter to support the description of concepts. Direct quotes from the research participants are integrated into the findings so that the emerging pattern represents research participants' views and the findings are grounded in the data. While presenting excerpts from research participants' data, pseudonyms are used to preserve confidentiality.

To improve the readability of this chapter and to avoid repetition of the concepts, the categories are presented first, followed by the core category, theoretical codes and the conceptual framework. Each category and core category is organised into three parts. The first part provides a brief description of the category / core category, including an overview of the emergent codes from the data which were used for the conceptualisation of the category / core category. The second part presents the findings that emerged from the raw data that supported the development of the category / core category. This part will use the excerpts from research participants. The final part presents a schematic figure that explains and provides a summary of the processes contributed to the generation of the category / core category.

8.1 Research Participants' Details

Since there were many instances in this thesis where the term 'participant' was used to denote a person with MS who participated in the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre, hereafter 'volunteers who participated in this research and provided data for this research' will be cited as 'research participant'. A total of 20 persons with MS who completed the six sessions 1-to-1 aquatic physiotherapy programme at the Burrswood Centre volunteered to participate in this research. Three volunteers were not recruited in the study because they were found unsuitable on the exclusion criteria. By the end of the data collection period a total of 17 suitable research participants were recruited in the study. 13 attended the interviews and four volunteers completed the 'letter-to-a-friend' method. Of the 13 interviews, nine attended the face-to-face interviews at the hospital, two completed Skype/FaceTime interviews, and two completed telephone interviews. Table 6 summarises the details of the research participants, their pseudonyms and the type of data collection method in which they participated.

During the planning stages of this doctoral study, it was decided not to categorise recruitment based on the research participants' age, gender, duration and type of MS. This decision was made deliberately to limit the influence of the preconceived taxonomy on the emerging concepts. Hence the data collection did not focus on these details. However, it was noticed at the end of the data analysis that out of the 17 research participants there was only one male research participant.

Number of participants (Total = 17)	Method of data collection	Pseudonyms
4	Letter-to-a-friend	Amanda; Belinda; Florence; Tamara.
13	Semi-structured Interview	9 = Face-to-face: Catherine, Diana, Brian, Gemma, Holly, Jemima, Megan, Olivia, Pearl. 2 = Skype/FaceTime: Karina, Nicole. 2 = Telephone: Imogen, Lara.

Table 6: Research participants' details

8.2 Categories

'Realising Potential', *'Positive Attitude'* and *'Enabling'* emerged as the categories of the carry-over benefit of the aquatic physiotherapy programme for people with MS. The following sections presents information about these categories and their corresponding codes. Relevant quotes from the research participants' data are used to support the findings.

8.2.1 Realising Potential

Participation in the aquatic physiotherapy programme benefited research participants in realising their own potential. They learned, gained a better understanding of their MS and their physical abilities and limitations, which helped them in realising their own potential. The data analysis produced a wide range of codes from different research participants which showed a pattern representing the concepts of learning, understanding and realising. The codes pertinent to these concepts are presented in Table 7.

Category	Codes
<i>Realising Potential</i>	<i>Learning to self-manage, learning from therapist's feedback, learning more about MS, learning about the importance of core, learning to give into fatigue, learning to rest, learning from others, learning about other treatments, learning home exercise, becoming more aware, being more informed, understanding physical abilities, understanding limitations, better understanding about MS, explaining helped understanding, realising weakness, realising physical abilities, realising reasons, realising limitations, realising the need for physical activity, realising the need for pushing, realising the ability to work.</i>

Table 7: Codes representing the category of *'Realising Potential'*.

The aquatic physiotherapy programme provided an opportunity for research participants to have focused discussions with physiotherapists on issues affecting them. They received personalised advice on wide range of problems such as fatigue, balance, fear of falling, stiffness, pain, spasm, weakness, posture and walking. Olivia believed that the problems of MS were difficult to understand and were not easy to explain to others. Despite this complexity, Olivia reported that the explanations she received from the physiotherapists during the sessions were easy to understand. The personal advice and explanations received during the sessions helped research participants to gain further information on their MS and achieve a better understanding of the problems of their MS:

"I learned an awful lot about MS. Before, I didn't know anything about MS really. There isn't an awful lot of help I don't think, because everybody has different things so, you know, you ask a question about MS, and it's like well because it's difference for everybody, you don't get one straight answer and so going on the course (aquatic physiotherapy programme) or whatever is just they deal with it all the time, and they answer your questions or your worries, things like that, so it just puts your mind at rest." (Nicole: 253-259).

"It helped me to understand my condition more, and I was given personal advice, like a walk from here down the corridor, and then he said to me your gait is not very good, you know, your leg is turning in. Try and walk keeping your foot turned out, and there were lots of things like that which were very helpful which made some difference. It has given me a better understanding because the physio in the pool, when we can't do something or whatever, she will explain, you know, that this is perhaps because the messages aren't getting the right way through for you to do these things, so I think it's helped to sort of explain things." (Olivia: 326-329, 466-469)

"They can give you the sort of say hopefully not the reasons, but why these things are happening to you, so that's good, you know, and understanding, so that makes you realise why these things are happening." (Karina: 690-692)

Imogen and Olivia gained knowledge of their core strength and understood its importance in maintaining their posture and also for completing the activities of daily living:

"I don't think I knew about the core really. I used to do yoga and things like that, many years ago, but I don't think the core was spoken about really. And I think I've learnt about the core and how that helps your whole body." (Imogen: 312-314).

"My understanding of the need for that (Core Strength) is improved." (Olivia: 368-369).

Almost all research participants reported fatigue as a significant problem. Three indicated that during the aquatic physiotherapy programme they learned more about their fatigue and gained a better understanding of it. The programme benefited these participants by making them efficient in recognising their fatigue and subsequently manage it. Understanding the importance of rest and learning to accommodate fatigue in their daily

lives were reported as among the strategies that were learned during the aquatic physiotherapy programme:

"One thing that this course (aquatic physiotherapy programme) made me more aware of, that the way to manage my fatigue and the way to actually put effort into what will help and then allow the fatigue to take over" (Gemma: 282-284).

"You do learn that you can give in to the fatigue and you must rest, and when you rest, you can come back from it. It's something you don't work through it, you know, after that you think right I'll go home and have a rest" (Imogen: 392-394).

In contrast to the views cited above, Megan and Jemima did not think that they learned anything new about their MS. Before attending the aquatic physiotherapy programme, they were already knowledgeable about their MS. Jemima gleaned knowledge accessing health information websites and chatting online. Nevertheless, Jemima believed that participation in the programme would be helpful for people who do not access internet resources and do not have the confidence to chat with other people online. Although Megan did not think she learned anything new about her MS, she thought that the feedback she received from the therapist was helpful:

"I had somebody saying to me, now this is the way you do it, this is the process that you go through when you're walking. That was helpful to have an outside observer" (Megan: 223-224).

After completing the aquatic physiotherapy programme, some of the research participants joined group exercise classes that were running at the same hospital. They suggested that they learned about the group exercise classes because of attending the programme. Participation in the weekly group sessions provided opportunities to meet other people with MS who were experiencing similar problems. Besides what they learned from physiotherapists during the aquatic physiotherapy programme, research participants also learned useful information from conversation with other MS patients. Group classes provided a networking opportunity which helped research participants to learn from each other, expand their knowledge of their MS, its related problems and find out about other treatments. These informal conversations helped them to learn about the ways in which others were overcoming the day-to-day difficulties caused by their MS and managing effectively:

"There's somebody who's had a bladder problem, and she's had some injections, and so she's been able to encourage other people and to say oh yes that's fine, it's not that bad" (Imogen: 520-522).

"When you are hearing how other people get on, how they've been on holiday, you know, how they've actually done it, what kind of holidays they've gone on, is useful actually" (Megan: 496-498).

"It's really good because you can get together, you can chat in the pool, and we discuss different things about MS, and they've tried this, and they've tried that, they've got their own opinions, and it's really good to get somebody else's opinion" (Nicole: 511-514).

The information learned during the sessions helped research participants to realise their own physical abilities and limitations. Lara said, *'It makes you realise that you can only go so far. You must try to limit what you do'*. Realising their own abilities and limitations helped them to realise their own potential. They learned about the type of physical activities in which they could participate. The aquatic physiotherapy programme provided an opportunity for research participants to try swimming as a form of physical exercise under the supervision of physiotherapists. This opportunity benefited some research participants in realising their ability to restart swimming:

"It made me think that oh well I can get in the water again, whereas if I hadn't have come to something like this to start me off again, I would never have just gone to a swimming pool" (Pearl: 369-381).

"It made me realise that I can do things, like swimming" (Jemima: 314).

"It gave me the confidence to go back in the swimming pool, if that makes sense, you know, for leisure purposes. I realised then that I could swim in the pool you know, I hadn't swim for years" (Karina: 435-436).

As shown in Figure 2, research participants learned about other treatments from interaction with other MS patients and learned about issues posed by their MS through personalised education received from physiotherapists (RP1). Learning improved participants' understanding of the issues posed by MS and their effective management (RP2). Better understanding benefited research participants in realising their physical abilities and limitations (RP3). Improved understanding enhanced research participants' knowledge of their physical ability to participate in more activities. Thus learning, understanding and realising contributed to realising their potential for participating in more beneficial physical, functional and social activities meaningful to them (RP4). Some of the examples of the benefits of learning, understanding and realising will be presented later under the core category section of this chapter.

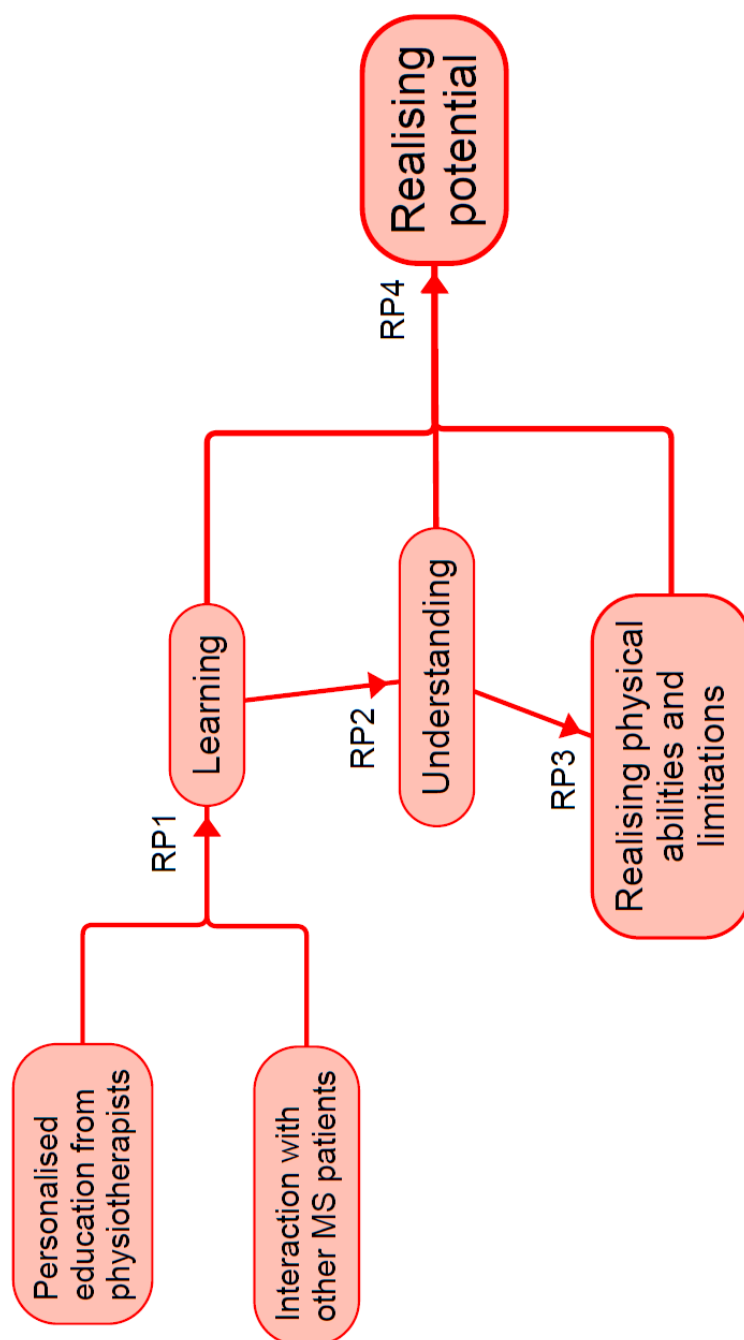


Figure 2: Emergence of '*Realising Potential*' as a category from the concepts of learning, understanding and realising physical abilities and limitations.

8.2.2 Positive Attitude

For the purpose of this doctoral research, 'positive attitude' was described as the carry-over benefit of the aquatic physiotherapy programme that resulted in positive change in the attitude of research participants. Positive attitude was conceptualised as a category because it effectively integrated a range of properties that emerged from the data that represented the concept of positive change in attitude of research participants. Positive attitude represented a range of codes that are presented in the Table 8. Psychological aspects were associated with the development of the positive attitude. Accordingly, some of the psychological benefits were integrated in this category.

Category	Codes
<i>Positive Attitude</i>	<i>Positive frame of mind, positive thinking, optimism, being positive, feeling positive, feeling better at things, feeling motivated, focusing on abilities instead of limitations, feeling inspired, believing in self, feeling self-worth, exploring new opportunities, trying new things, developing a can-do attitude, changing perspective, approaching life differently, approaching life positively, feeling happy.</i>

Table 8: Codes representing the category of 'Positive Attitude'.

After participation in the programme research participants felt positive and developed a can-do attitude to the functional activities of their daily life:

"The sessions made me feel more, even more, that I can do. My can-do attitude has improved, definitely, because aquatic session just makes you feel so much better about things" (Jemima: 425-426, 430-431).

"Yeah, I can actually do this...because you spend a lot of time thinking I can't do this ... I can't do this. When you come, and it (aquatic physiotherapy programme) can coach your fitness to be back for your situation" (Holly: 101-103).

"I do think keeping helping to boost the positive feeling in me is important for me. I am sure this is true for many people. I am sure it is important to me, to keep that can-do attitude. I think I am more positive" (Gemma: 160-162, 232).

"You could get potentially fed up with MS. Something like this (aquatic physiotherapy programme) particularly gives you the sense of I can do this and I can make some difference" (Diana:96-97).

Catherine, Jemima, Pearl and Holly responded affirmatively to the question about the benefit of the aquatic physiotherapy programme in changing their attitude towards their MS and positively managing their life with MS. Amanda not only improved in her can-do attitude but also developed a '*positive frame of mind*' towards her life. For some research participants, the positive change in their attitude to their MS made them approach their MS differently and manage it more positively. For example, the positive can-do attitude developed from the programme made Imogen treat her MS differently, behave harder towards her MS and not let it win over her. The benefits of the programme extended beyond the positive feelings to the extent that Lara changed her attitude and perception of her life with MS:

"It did (change my attitude) because, I'll be perfectly honest with you, when I was first diagnosed, I was waiting to be told you've only got so many months. When I was told what it was I thought well there's no hope really, I was dragging a leg, I had no feeling down my left-hand side whatsoever, and I was dragging this poor leg along, and one thing and another, and then my eyes were going peculiar, and you know, I honestly didn't think that I would now be in this position, this further on, no" (Lara: 200, 204-210, 255).

Besides the physical benefits, many research participants gained psychological benefits as the carry-over effects of attending the aquatic physiotherapy programme. It was evident that participation in the therapy generated positive feelings in research participants. Gemma, Karina, Nicole, Olivia, Pearl and Tamara felt psychologically better after the programme. Nicole reported '*feeling great*' after the sessions. Tamara felt positive because she was achieving something by participating in the aquatic sessions. Gemma and Olivia talked about a sense of wellbeing and feeling happier after the sessions. Olivia emphasised that unlike the physical effects, the psychological effects carried over after the programme which helped her to change her approach to life. The benefits apparently made Karina develop a positive attitude to exercise. The sessions also benefited Megan's can-do attitude and made her become positive and more open to positive thinking about her life. The aquatic physiotherapy sessions improved research participants psychologically and their can-do attitude:

"I can think of things, physically and but I do know psychologically as well. It always gives me more confidence. I think the psychological is huge because people who have primary progressive as well you know you want to know you can hold on to whatever you got still and have a life, that's really important. We should not under estimate the psychological effect and the sense of wellbeing and the fact of moving body helps one's mind you know that is so important as well, being able to move your body" (Gemma:150-151, 304-306, 318-320).

"The main thing was I felt that I was able to relax a little more. Not at the time necessarily, but when I got home. I felt that something had made me feel better. Mentally that comes into it one hell of a lot, as you can imagine" (Pearl:23-25,29).

"Psychologically it (aquatic physiotherapy) makes you feel much better. It's very good. I would rate it very highly. I think just a feeling of being positive and having a social communication, feeling that you can take forward, and an approach to life, you know, that's quite positive and different" (Olivia: 405-406, 668).

"A lot of it is psychologically, you see, seeing is believing almost. Because I saw that I had done it (aquatic physiotherapy programme) and saw that it had made an improvement, and I really did feel like I had improved so much, that boosted my confidence, made me psychologically think to myself, yes, do you know, you can do it" (Lara:189-192).

"It (aquatic physiotherapy) makes my mind more open to feeling not like a poor me, but like a me who can jolly well do it, and take on new things and be fulfilled in the situation in which I am, rather than mourning over what isn't at the moment" (Megan: 168-180).

"I think it's just a sense of wellbeing; it's (aquatic physiotherapy) just making you feel better, because you're actually being able to do these exercises that you never thought you'd be able to do again in the water" (Karina: 622-624).

A wide range of codes emerged from the research participants' data that saturated the concepts of 'positivity' and 'development of a can-do attitude'. As shown in Figure 3, after the aquatic physiotherapy programme research participants achieved psychological benefits such as 'positive thinking' and 'positive feeling'(PA1). The psychological benefits carried over and continued even after completing the aquatic physiotherapy programme. After the programme, research participants also developed a can-do attitude. The improvements gained in the can-do attitude helped participants to approach their life with MS from a positive perspective. Development of the can-do attitude and the psychological benefits contributed towards development of positive change in the attitude of research participants which emerged the category of 'Positive Attitude' (PA2). Further examples depicting the benefits of positive attitude and changes in the research participants' lives will be presented under the core category of 'Empowering'.

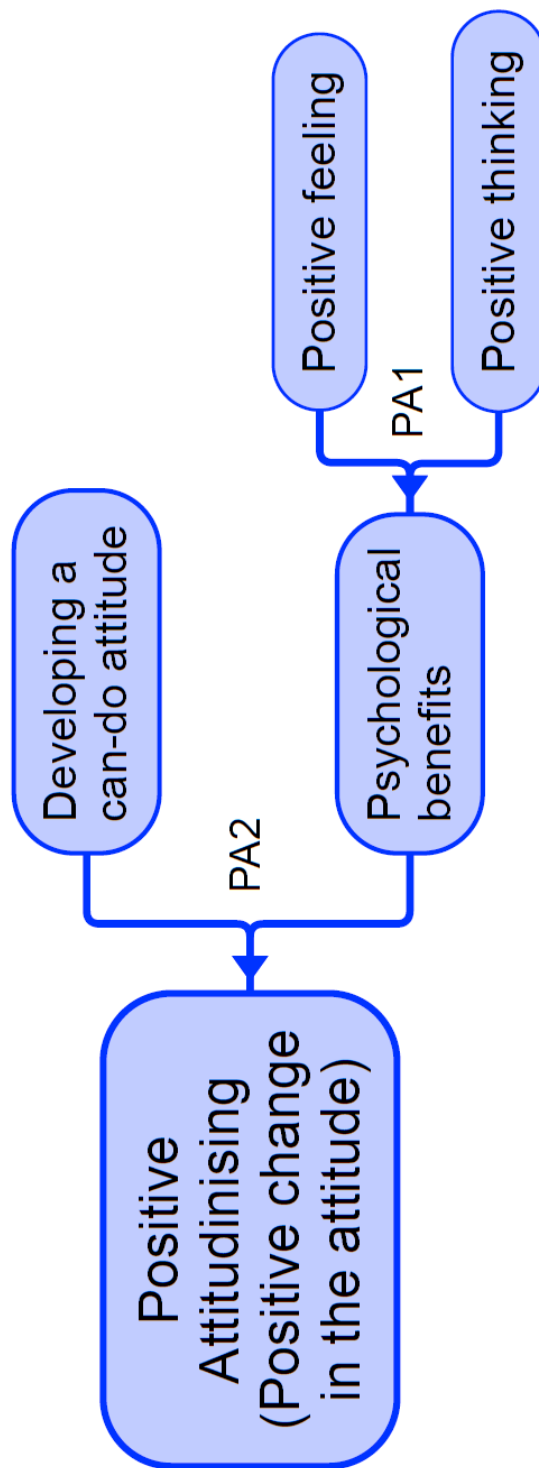


Figure 3: Emergence of '*Positive Attitude*' as the category from the carry-over benefits of developing a can-do attitude and psychological benefits.

8.2.3 Enabling

For the context of this research, ‘*Enabling*’ was described as an improvement achieved, following the aquatic physiotherapy programme, in the ability of research participants to participate in the relevant physical activities. The category of ‘*Enabling*’ emerged from the data that represented a wide range of codes presented in Table 9.

Category	Codes
<i>Enabling</i>	<i>Improving balance, not falling, feeling able to prevent falls, able to stand on one leg, overcoming fear of falling, feeling confident, improving confidence, boosting confidence, gaining confidence, exercising with confidence, building strength, strengthening from exercise, continuing to be stronger, improving strength in muscles and limbs, strengthening core muscles, freedom to do activities, feeling of liberation, enabling to do, able to move, walking, moving freely, maintaining independence, being independent, maintaining mobility, physical movement, exercising, trying new activity, looking after grandchildren, going out, meeting people, shopping, participating in fundraising, participating in chores.</i>

Table 9: Codes representing the category of ‘*Enabling*’.

Carry-over benefits achieved in the physical and psychological domains enabled research participation in physical activities such as exercising, functional and social activities. The benefits achieved in physical ability were due to the improvements gained in the strength, balance, walking, and confidence. Research participants improved in some of their key MS related problems such as muscle weakness, lack of balance,

stiffness and difficulty in walking. They also gained psychological benefits such as overcoming the fear of falling, improving confidence to participate in the functional and social activities. Some of the examples representing the psychological benefits were presented earlier under the category of *Positive Attitude*. Further examples supporting the concept of enabling will be used here.

Because of their physical disability, some of the research participants were unable to participate in any form of physical exercise on land. But the advantages of the properties of the water made them to feel able and confident which consequently enabled them to exercise in the pool without fear of falling. The benefits of the water environment enabled some of them to the extent that they actively participated in various types of physical exercise with confidence, such as swimming, cycling, jogging, bouncing, power walking, which were not possible for them on land:

"I think it (aquatic physiotherapy programme) increased... improved confidence tremendously. Walking in water, you have resistance so it's more difficult, but you don't need to hold on because you know you're not going to, well if you fall over you're not going to injure yourself" (Olivia: 95-98).

"That (Buoyancy) is so helpful in the freedom of movement. It is so amazing, and it is lovely too because, I am almost getting emotional, because there is a feeling that it doesn't matter if I fall over because I have had fear of falling, having had number of fractures you know and so on. So that is wonderful" (Gemma: 68-81).

"I used to be able to lift my legs, put them right back behind my ears, and I couldn't do these things anymore, because I couldn't control my limbs. I don't know what it was, so doing it in water somehow, I was able to walk in the water without worrying about falling. The benefits being physical movement, that I can do in the water which I don't even think about doing on land, that's making me feel freer and the balance as well" (Megan: 98-100, 126-128, 461-463).

"It's just a comforting thing to go into the water and know that you're not going to fall and hurt yourself and you can get a bit of exercise, you can cycle your legs or even do a bit of swimming or all sorts of things that we do. So, for me it's my one opportunity to get exercise which is I just can't do and you also get to do, even if it's just power walking up the pool. I couldn't walk on dry land without a walking stick, but I can walk in water. Because going in the water means you do things that you know you can't do out of the water, even just simple things like walking from one end of the pool to the other. Even just walking. I can't walk, I can in there. It's just everything really that you do in the water, you can't really do. And as I said to you then, even swimming" (Jemima: 186-180, 498-500).

"Some exercises such as marching on the spot are achievable in the pool but not on land" (Tamara: 33-34).

After the aquatic physiotherapy programme, research participants improved in their ability to maintain balance during functional activities on land. Amanda wrote in her letter: *"My balance is noticeably improved"*. Some suggested that the benefits achieved in balance

were due to the type of exercise they performed in the water that were particularly aimed at the specific balance problems affecting them. Catherine, Gemma, Imogen and Olivia used to fall before attending the programme. Since the completion of the therapy, they gained considerable improvements in their balance to the extent that they stopped falling:

"Before I came here, I just used to fall over, and broken ribs and things like that, you know, I mean fallen quite awkwardly, but that seems to have improved a lot since (aquatic physiotherapy programme). From my point of view a great improvement" (Olivia: Ln102-104,113).

"I seem to have cut down any falls that I have, which at home and outside. It is a long time since I had an actual fall. I think that is just ongoing" (Catherine: 42-44).

"I have had a lot of falls. Whereas nowadays I don't have any. When I say that, not a fall that caused any damage. I may have stumbled, but I haven't had a serious fall. I am not falling. I am doing well" (Gemma: Ln31, 133, 152, 236).

"I used to fall. I haven't fallen over for quite a few years now. I do feel better to be able to save myself" (Imogen: 288, 282, 288).

Amanda, Gemma, Karina, Imogen, Megan and Olivia improved in their strength, particularly in their core and lower limbs. Research participants attributed the improvements in their functional ability to the improvements in their strength. Amanda improved in her walking ability and attributed this to the improvements she gained in the strength of her lower limbs. Gemma and Imogen spoke of feeling strong in their muscles after the intervention. Megan suggested that the benefits gained from the aquatic physiotherapy programme made her sleep better, feel relaxed and revitalised which overall made her feel stronger in herself. According to Olivia, the improvements gained in her core strength were important for the increase in her functional abilities such as standing on one leg and managing stairs. Karina expressed a similar view of benefits of the programme in building her core muscles and their importance in participating in the functional activities of daily living and being able to take up childcare:

"I think it's (aquatic physiotherapy programme) helped with my core muscles which is what's important, you know, for standing and walking and moving around" (Karina: 181-182).

"He'd (Grandson) run off and I'd say H, no I can't do that, you know, Nanny can't run... he knows what I can and, you know, can't do. But I suppose it (aquatic physiotherapy programme) has, I didn't know how I was going to get on my looking after the children, you know, looking after him then and I'm doing OK really, so I mean hopefully, doing these exercises, they're helping me with my strength, just being able to do that" (Karina: 302-306).

Freedom of movement was mentioned by six participants as a benefit of exercising in the water. According to Gemma, Holly, Karina, Megan, Nicole, and Tamara, properties

of the water such as warmth and buoyancy loosened their muscles which subsequently resulted in the freedom of movement in their joints. Exercise in the water made them feel relaxed and free in their body which enabled them to move very fluidly:

"Freedom of movement in the water is wonderful. The effect of water is so freeing. I felt more able to extend my limbs to use my joints more freely. When I have had a relapse, I was stuck in bed, sitting in the chair or waiting for a carer. When you come for the session, you can actually move in the water, that's liberating, so that's really good" (Gemma: 62, 102-103, 321-322, 325-328).

"It's easy to feel enclosed with your body and I think that feeling of enclosure can grow. The tension, it doesn't leave you free to move and do things in a relaxed way, my muscles feel tense all the time and never feel relaxed. The benefits being physical movement, that I can do in the water which I don't even think about doing on land, that's making me feel freer" (Megan: 126-128, 461-462).

"I have found my body moves more freely. In the pool, I fully work my muscles, including those that don't normally get much use" (Tamara: 25-26).

Improvements in balance contributed to improvements in the walking ability of research participants. Amanda, Catherine, Gemma, Imogen and Olivia reported improvements in their walking ability. In addition to walking, Amanda and Imogen also improved in their ability to go up and down stairs. Improved walking enabled them to the extent that they participated in physical and social activities that were not possible prior to attending the aquatic physiotherapy programme:

"Before I was barely able to walk anywhere and I felt that my legs are going to give up on me. Whereas nowadays I can walk to my local post box, may be 3 and 400 yards and then back, which feels to me like a little bit of an exercise in the fresh air but it doesn't fatigue me. Definitely, it's an improvement since then" (Gemma: 129-130, 133-136, 144).

"I think being able to go out and walk about, because I live in a village, and I could walk out and meet people and do shopping, which really helped" (Olivia: 223-224).

Group exercise sessions provided socialising opportunity to research participants. Participation in the group exercise classes helped in overcoming issues of isolation. The opportunity to interact with others during the group exercise classes enabled research participants to meet new people. Group exercise classes were considered a good socialising opportunity because they interacted with other people with MS, made new friends, and had a good time together:

"It's good socially from that point of view because I didn't know them and it's always interesting because other people have the same conditions and they tell you different things, and you can help each other, you know. So that's been very valuable" (Olivia: 123-125).

"Beforehand, well I suppose I didn't know so many people, so from a social perspective it was good because it (aquatic physiotherapy programme) has given me more, a wider circle of friends" (Imogen: 84-85).

The associations between the carry-over benefits and their relationship to the development of the category of *Enabling* are summarised in Figure 4. Improved strength benefited research participants by improving their confidence levels to participate in the physical activities (EN1). Strengthening also benefited by improving ability to maintain balance during the physical activities (EN2). The improvements in balance contributed to improvements in confidence levels (EN3). In summary, research participants gained carry-over benefits in their MS problems such as strength, balance and confidence which enabled them to participate in a wide range of physical activities, such as walking and exercising (EN4). The carry-over benefits of aquatic physiotherapy programme enabled them to participate in the group exercise classes which provided a socialising opportunity (EN4).

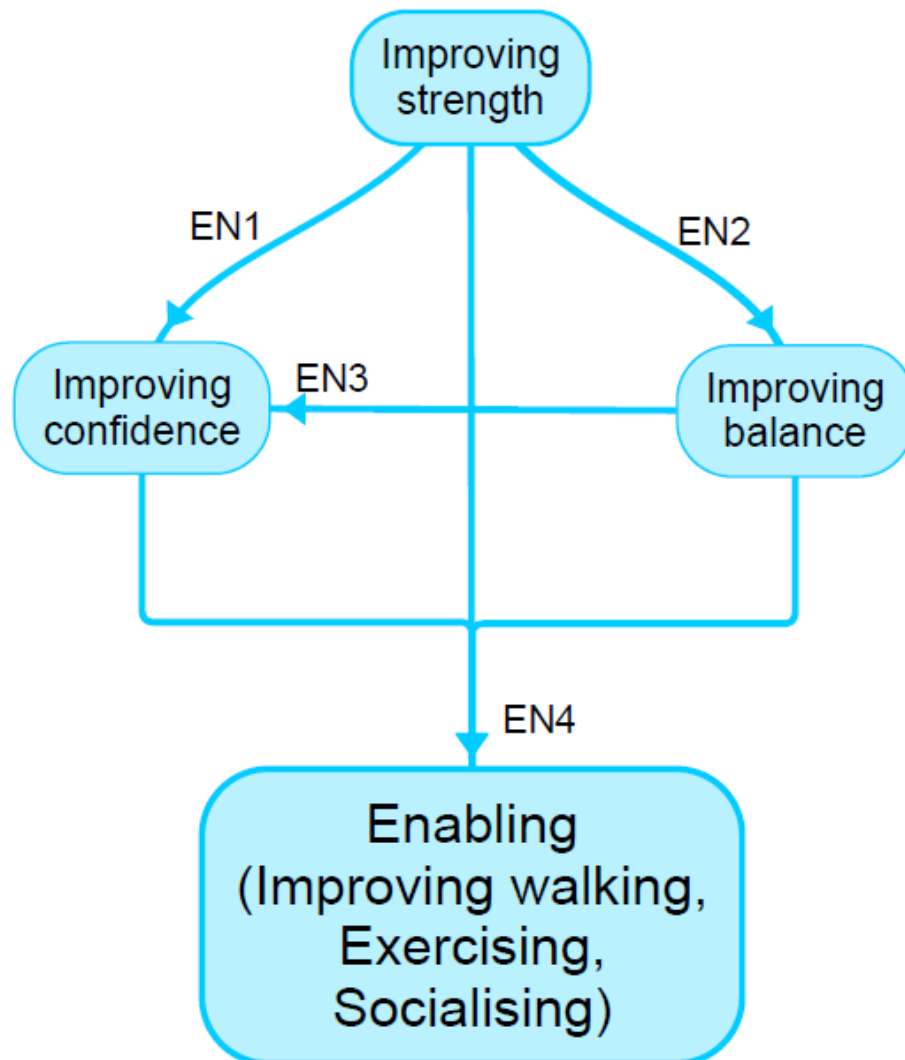


Figure 4: Emergence of '*Enabling*' as the category from the carry-over benefits of improving strength, improving balance and improving confidence.

8.3 Core Category: Empowering

The core category of '*Empowering*' integrated the categories *Realising Potential*, *Positive Attitude*, *Enabling*, and accounted for much of the variation in the research participants' behavior. For the context of this doctoral research, *Empowering* is described as the process through which research participants gained a better control over their lives with MS. Empowerment was considered to have happened when research participants either tried or made changes to the behavior or activities pertinent to their lives. *Empowering* emerged as the core theme representing the carry-over effects of the aquatic physiotherapy programme for people with MS. *Empowering* was conceptualised as the core category which represented the categories: *Realising Potential*, *Positive Attitude* and *Enabling* (Figure 5). The codes emerged in the data represented a wide range of properties relevant to the process of empowering. These are presented in Table 10.

Core Category	Codes
<i>Empowering</i>	<i>Gaining control, participating in more activities (such as physical, functional, social, work), taking up new activities, taking up challenges, trying and being independent, treating MS differently, putting effort into understanding, realising to challenge, changing understanding, joining the group exercise class, being in-charge of MS, being harder on MS, positively managing, being independent, being pro-active in self-management, taking more responsibility, finding better ways for self-management, making effort, trying, engaging, implementing better management strategies, exercising.</i>

Table 10: Codes representing the core category of '*Empowering*'.

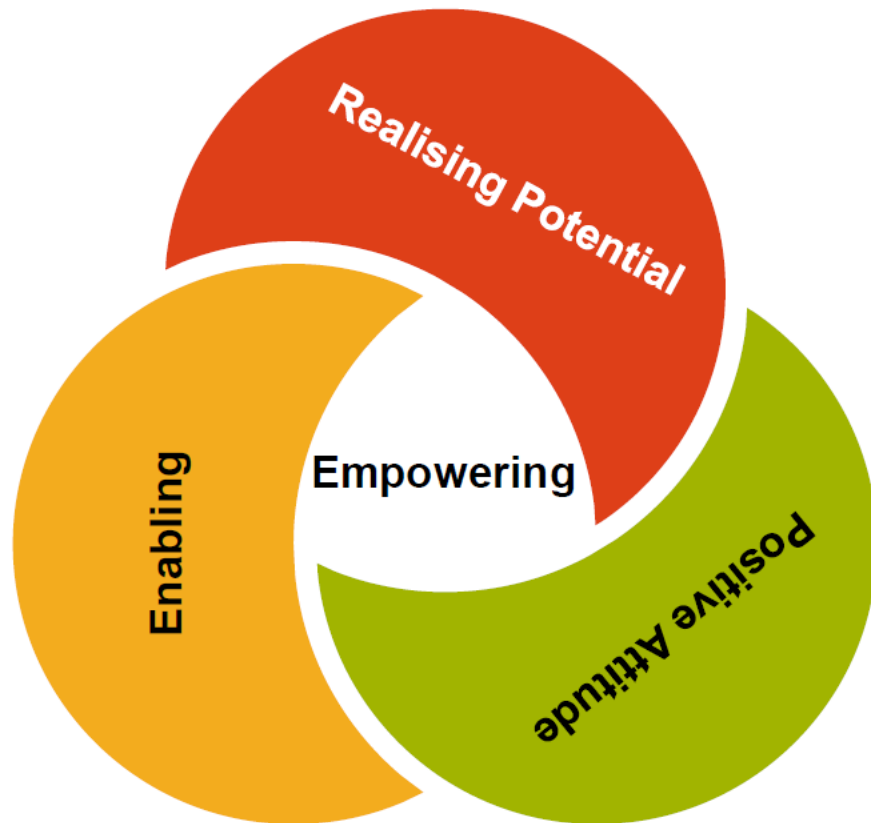


Figure 5: *Empowering: Realising Potential, Positive Attitude and Enabling.*

The carry-over effects such as learning, better understanding and realising empowered research participants. Learning achieved during the sessions with the therapists and conversation with other patients aided research participants in developing new insights into their MS. They learned different ways of managing their MS problems and became confident in trying new management strategies. They achieved better understanding of the various aspects of their MS. Improved understanding gained from the aquatic physiotherapy programme equipped research participants with knowledge that helped them in the better management of their MS. Better understanding and knowledge empowered them to explore and implement strategies that were helpful in managing the problems of their MS. For example, some research participants not only learned and understood about their fatigue but also started problem-solving, putting effort into exploring and implementing alternative fatigue management strategies:

"It (aquatic physiotherapy programme) made me more aware of is that the way to manage my fatigue and the way to actually put effort into what will help and then allow the fatigue to take over, so I was able to manage the fatigue better" (Gemma: 281-283, 285-286).

"I think it (aquatic physiotherapy programme) makes me realise, it makes me more aware when I became fatigued, I can sort of spot fatigue coming and try to sidestep it a bit, which is one of the good things, you know" (Olivia: 335-338).

The aquatic physiotherapy programme improved research participants' ability to self-manage the problems of their MS. Strategies advocated by the therapists such as participating in home exercise, maintaining good posture, strengthening, self-stretching, pacing, taking frequent rests and exercising regularly were helpful in implementing self-management interventions at home. They received personalised home exercise programmes that many of them completed at home as part of their self-management:

"It is the exercise they give you to do, because you carry on doing those at home even though it is not in the pool or anything. It's like learning that there are some exercises about kind of stretching the muscles down the back of your leg and that kind of thing, and it's learning how to do them at home because it obviously helps" (Nicole: 219,220, 265-268).

"Since then (aquatic physiotherapy programme) I have been concentrating on exercising my Right ankle, leg and it has improved my gait and strength" (Amanda:20-21).

"They (physiotherapists) assessed how you were before then gave you the exercise specifically for you. I've had a health problem, like with my shoulders, they had given me exercise to do at home on land" (Karina: 485,486, 498,498).

"We do stretching exercises and things like that which are very helpful, and they are things you can take home and continue" (Olivia: 346-348).

Some research participants learned to pace their activities which was a necessary skill for the better management of their fatigue and gaining control over their life with MS. Better understanding of their MS and learning about the secondary complications helped them to treat their MS differently from before and put them in charge of their MS problems. They became more pro-active in their self-management so that they could continue to maintain the benefits achieved from the aquatic physiotherapy programme. The carry-over benefits of the aquatic physiotherapy programme encouraged research participants to explore opportunities and implement strategies that enabled them to engage in self-management activities. For example, some research participants explored venues for continuing exercise, and started participating in leisure activities. They also started putting more effort into exploring better self-management strategies that would help manage the complex problems of their MS, such as fatigue and pain. The aquatic physiotherapy programme helped research participants in recognising the impact of their MS and the importance of getting back to managing their MS. Some started being harder on their MS by positively managing its problems:

"When I retired I had a bit of precipice I think and then found and thought I am not actually doing anything to manage this (MS). It's getting on top of me. It's starting to invade my space. I don't use the word stress or depression necessarily but yes you could get potentially fed up with MS. Something like this (aquatic physiotherapy programme) particularly gives you the sense of I can do this, and I can make some difference and the fact that I am actually physically coming here and doing it means I am in charge and I am doing something very positive so psychologically that's a help because you do feel as you are in charge I suppose much more. This has been a great boost by coming here which has taken me back into feeling that I am back into managing" (Diana: 95-101,112,113).

"It (aquatic physiotherapy programme) makes you treat your MS in a different way. You begin to be a bit harder on MS because you think, well I actually can do. I can actually do this; I am not going to let this win. You know, I'm going to be this and it's being a bit more pro-active" (Imogen: 368, 382, 383, 388).

The carry-over effects achieved from the aquatic physiotherapy programme extended beyond learning, understanding and realising the problems of their MS. The improvements achieved from the programme helped research participants in understanding the importance of going further, realising the need to maintain regular physical activity which consequently empowered them in participating in more physical activities in their lives:

"I realised that I had actually got to push myself more than I ever did. Because I was letting my MS restrict me in lots of ways, and having had the hydrotherapy (programme) and realising

that actually, I needed to do things. I don't think I ever realised that exercise in the water like that could do what it did to me. And then now, I carried on doing things that I wouldn't have done before. I wouldn't; I don't think I would have made as much effort, it was almost a kick start for me" (Lara: 46-48, 86-89).

"It (aquatic physiotherapy programme) did give me more confidence to do other things for years and years I never wanted to do that, but now I do try to walk more" (Karina: 435-436).

"In the kitchen, I could feel that I could stretch and get something from the top higher shelf. I would actually try, you know, especially recovering from relapses you know when you are feeling quite unwell it was wonderful because you had more feeling that you could achieve. If you tried to go upstairs things like that" (Gemma: 106-110).

The aquatic physiotherapy programme improved research participants' mobility and their ability to participate in more physical activities. They became more functional and active in their daily lives. Some participated in more social activities with their family and friends. For example, Gemma, Lara, Karina, Olivia and Megan became more active in walking, gardening and shopping. Belinda and Karina indicated that the programme contributed to their keeping up their mobility and maintaining their functional abilities. The programme empowered research participants in taking up activities that were previously considered either too challenging or unattainable. Catherine also emphasised that many of these new activities were beyond her expected abilities.

The improvements gained from the aquatic physiotherapy programme made Gemma, Karina and Holly feel able and confident in their ability to swim. Gemma and Holly were empowered to the extent that they joined a public swimming pool and took up swimming as a form of routine exercise. Karina realised her ability to swim safely in the pool. This realisation empowered her to the extent that she used a leisure pool and swam when she went on a holiday with her family. Research participants felt able to participate in the physical activities which empowered them to participate in more activities, and some also took up new physical activities:

"I used to love swimming, and I used to do an awful lot of swimming, and at the end of the session, I just did a couple of lengths in the pool here. So, when the course (aquatic physiotherapy programme) was up I felt able and confident to go to a public pool, and I swam three-quarter of the length" (Holly: 35-38).

"From not being able to get around and not being able, you know, losing all these other things, I have got myself back to being you know, more and more mobile" (Karina: 585-586).

"It (aquatic physiotherapy programme) had introduced me to swim again, coming here, because I used to like swimming when I was a lot younger, and it's introduced me to that again" (Jemima: 268-280).

"I suppose it (aquatic physiotherapy programme) made me think that oh well I can get in the water again, whereas if I hadn't have come to something like this to start me off again, I would never have just gone to a swimming pool" (Pearl: 368-369).

The benefits gained from the aquatic physiotherapy programme made research participants feel more confident in their balance and walking ability which made them become independent in their lives. For example, because of the improvements gained in confidence levels, Imogen became independent to the extent that she did not require any external support in her daily activities. Physical and psychological benefits achieved from the programme helped Lara to become independent, which empowered her to the extent that she returned to work. The programme empowered some research participants to the extent that they became independent and participated in new activities such as hobbies and work:

"It (aquatic physiotherapy programme) has improved my confidence, because yesterday we went to Goodwood and did the MS kind of round the track thing, for the MS Trust, and before I couldn't have done anything like that, so it's definitely, and I'm doing this jumping out of a plane thing, and I would never have done anything like that before, so it definitely is helping" (Nicole: 204-208).

"It (aquatic physiotherapy programme) has improved independence. It was the difference between me deciding to try and go back to work or not, and that was the real push because I suddenly realised that actually, maybe I could do it, and I have done it" (Lara: 156-158).

"I've been going once a week to a drawing class, which is good, which I enjoy. That's in the village that I go to. So that's (aquatic physiotherapy programme) given me something, you know, and I have to carry my stuff in there and find somewhere to sit. Generally, you know one feels better, and I think afterwards, a bit more confident to do things like go in the garden. I think generally just walking about, being a bit more independent, feeling a bit more independent" (Olivia: 193-194, 255-256, 235-238).

The carry-over effects made research participants become more active with their families and take up new responsibilities. For example, the improvements gained in strength empowered Karina to the extent that she accepted childcare responsibility and looked after her preschool grandchildren. Some became more active and participated in more activities with their family:

"Having done this (aquatic physiotherapy programme), I then could do more with the children in the weekend. You know by doing this that will impact on them and I will be able to go on doing this for so much longer" (Diana: 119-121).

"It (aquatic physiotherapy programme) made me feel I want to do more things at home that I have not, that I've been out of really. I mean I used to enjoy cooking. Without changing my whole kitchen, there's no way I can get to do the things I want to do now. So, what I can do is

organise my husband and he's getting very good at it now so he does more, with my instructions in a way" (Pearl: 402, 403, 408-410).

Prior to attending the programme, most research participants were not leading a physically active life. Because of the benefits achieved from the aquatic physiotherapy programme, they realised the importance of participating in a regular physical activity. After completing the programme many were empowered to the extent that they decided, joined and participated in the weekly group aquatic exercise classes that were running at the Burrswood Health and Wellbeing Centre. Some who could not attend the group aquatic exercise classes at the Centre joined exercise classes that were running at their local leisure centre. Pearl suggested that the aquatic physiotherapy programme was the turning point in her life because she then restarted exercise. The programme empowered some research participants to make significant changes to their exercising behaviour:

"I go on my exercise bike at home. I got it after (aquatic physiotherapy programme). Because I felt after going to Burrswood, it became very apparent that exercising was the reason that keeps you mobile" (Nicole: 436, 446, 450-451).

"That (aquatic physiotherapy programme) prompted me then to go to local gym in Sevenoaks. So right till this day I have been going to do exercise in gym under supervision" (Gemma: 213-215).

The changes in the exercising behaviour of the research participants were explained by two theoretical codes: 'facilitating factor' and 'detraining factor'. For the context of this thesis, a 'facilitating factor' was described as the enabler that encouraged research participants with MS to participate in exercise and maintain a physically active lifestyle. Conversely, a 'detraining factor' was described as the barrier that discouraged research participants with MS to participate in exercise and maintain a physically active lifestyle. The benefits achieved through *Realising Potential, Positive Attitude and Enablement* became facilitating factors. Many research participants changed their exercise behaviour and some to the extent that they started regular exercise. The emergent codes that represented the properties of detraining factors were: *exhaustion, difficulty with getting changed, organising transport, pool temperature, lacking confidence, lacking facilities, effort, lack of funding, costing, affordability, binding contracts, financing for sessions and timing of sessions*.

8.4 Summary of Findings

This summary presents the perspectives of research participants with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. This section of the findings chapter consolidates the links between the categories and the core category found in this study. The association between *Realising Potential*, *Positive Attitude*, *Enabling and Empowering* is depicted in Figure 6 and the arrows explain the associations between them.

Because of the personalised education received from the physiotherapists and interaction with other MS patients research participants learned new information about their MS (RP1). Learning improved their understanding of their MS problems and effective management of these (RP2). Better understanding helped research participants to realise their own physical abilities and limitations (RP3). Improved understanding enhanced research participants' knowledge of their physical ability to participate in more activities. They made informed decisions based on their improved knowledge; realised what they could do and could not do. Thus, learning, understanding and realising abilities and limitations contributed to realising their own potential for participating in more physical, functional and social activities significant to them (RP4). Improved knowledge gained through learning and understanding, made research participants to realise the importance of regular physical activity in managing their MS (RP5). Realising importance of regular physical activity and realising the potential for physical abilities empowered research participants to join exercise classes and start exercising regularly (EMP1).

Improved strength benefited research participants by improving their confidence levels to participate in the physical activities (EN1). Strengthening also improved their ability to maintain balance during the physical activities (EN2). This contributed to improvement in confidence level (EN3). In summary, research participants gained carry-over benefits in their MS problems such as strength, balance and confidence which enabled them to participate in a wide range of physical activities, such as walking and exercising (EN4). The carry-over benefits enabled participation in the group exercise classes which provided socialising opportunity (EN4). Improvements gained in the strength, balance and walking enabled research participants to become more physically, functionally and socially active. Additional to physical benefits, psychological benefits such as improved confidence empowered research participants to participate in more functional activities and accomplish social roles. Some research participants improved in their confidence

levels to the extent that they started trying new functional and social activities that were previously considered by them as too challenging. Enabling empowered research participants which promoted independence, acceptance of new responsibilities, regular exercise, resumption of work, the taking up of new hobbies and participation in more social activities with family and friends (EMP2).

After the aquatic physiotherapy programme research participants achieved psychological benefits such as 'positive thinking' and 'positive feeling' (PA1). The psychological benefits carried over and continued after completion of the programme. Research participants also developed a can-do attitude. The improvements gained in the can-do attitude helped them to approach their life with MS from a positive perspective. Development of the can-do attitude and the psychological benefits contributed to development of positive change in their attitude to managing their lives with MS (PA2). They looked at their MS problems from a different perspective and solved them by exploring alternative interventions. The carry-over effects of the aquatic physiotherapy programme extended well beyond the physical and psychological benefits. Some research participants were empowered to think more positively and made positive changes to belief in their ability to manage their MS. They engaged in better self-management strategies by problem-solving the issues related to their MS.

Because of the carry-over benefits achieved from the aquatic physiotherapy programme, research participants became more pro-active and made changes to their self-management. They implemented problem solving, explored opportunities for regular exercise, tried and engaged in the new self-management strategies. They treated their MS differently and started being harder on their MS. They became confident and independent to the extent that they accepted new responsibilities and participated in more functional and social activities significant to them. They made positive changes to their exercising behaviour and participated in regular exercise. The carry-over benefits achieved from the aquatic physiotherapy programme provided knowledge, skills, positive attitude and confidence that facilitated the process of empowerment (EMP4). Research participants gained control over their MS problems and took charge of their MS which demonstrated the process of empowerment as the main carry-over effect of the aquatic physiotherapy programme for people with MS (EMP4).

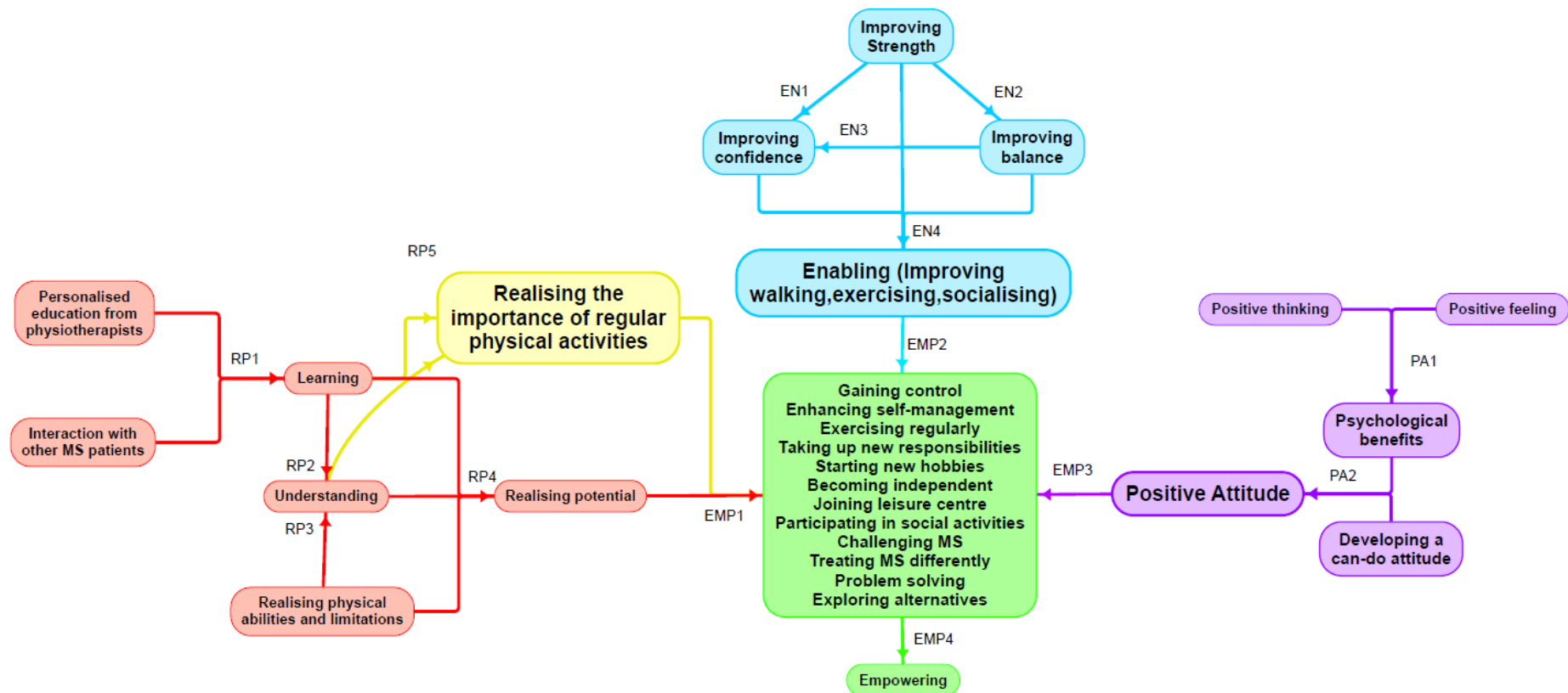


Figure 6: Emergence of ‘*Empowering*’ as the core category from the carry-over benefits achieved from the categories of ‘*Realising Potential*’, ‘*Positive Attitude*’ and ‘*Enabling*’.

Chapter 9

Grounded Theory Literature Review

Chapter 9: Grounded Theory Literature Review

The findings of the Grounded Theory research identified 'Empowerment' as the core category representing the perspectives of people with MS about the carry-over effects of aquatic physiotherapy. The Grounded Theory literature review in a Classic Grounded Theory research is used to situate the findings within the body of knowledge and compare the findings by exploring similarities and differences between them and the existing literature (Christiansen, 2011). Thus the selection of prior evidence that could be used for the discussion of the Classic Grounded Theory research is based on its 'fit' to the emergent concepts (Christiansen, 2011). Prior literature that 'fits' with the findings of Classic Grounded Theory study are considered as 'new data' that could strengthen, expand, refine and modify the emergent theory (Christiansen, 2011, p.24). Therefore, the identification, selection and inclusion of prior evidence for this study was delimited to the concept of empowerment of a person with Multiple Sclerosis. Prior evidence related to the role of physiotherapy in the process of empowerment and relevant aspects of patient empowerment that 'fit' the findings of this research were considered.

9.1 The Topic of Interest

The Grounded Theory literature review focuses on the concept of empowerment from the perspective of people with Multiple Sclerosis.

9.2 Origin of the Topic of Interest

The findings of the Grounded Theory research identified 'Empowerment' as the core category representing the perspectives of people with MS about the carry-over effects of aquatic physiotherapy. This finding contributed to the origin of this topic of interest. Before presenting the methods implemented in the Grounded Theory literature review, an introduction to the concept of empowerment is presented.

9.3 Concept of Empowerment

The term “empowerment” is used in a wide range of professional fields to express some form of a positive quality. Examples of the use of the term can be found in the fields of information technology, the industrial sector, organisational development, social justice, education, feminist literature, community involvement, and health and social care. The meaning ascribed to the term depends on the field. Taking into account the scope of the present study, the concept of empowerment from the health care sector and references to patient empowerment in particular have been considered.

Empowerment is defined differently by different authors. Some of the commonly reported definitions found in the literature (Bravo, et al., 2015) are:

“Empowerment is a process of helping people to assert control over the factors which affect their health” (Gibson, 1991).

“In health promotion, empowerment is a process through which people gain greater control over decisions and actions affecting their health” (World Health Organization, 1998, p6).

“Patient empowerment in the health care context means to promote autonomous self-regulation so that the individual’s potential for health and wellness is maximised” (Lau, 2002).

“Patient empowerment is defined as helping patients discover and develop the inherent capacity to be responsible for one’s own life” (Funnell and Anderson, 2004).

“Empowerment may be defined as a complex experience of personal change. It is guided by the principle of self-determination and may be facilitated by health-care providers if they adopt a patient-centred approach of care which acknowledges the patients’ experience, priorities and fears” (Aujoulat, d’Hoore and Deccache, 2007).

Most of the above definitions regard patient empowerment as a concept of change at an individual level. The World Health Organization's glossary of terms considers empowerment to be a concept associated with the community as well as individual (WHO, 1998). For purposes of this research, the concept of empowerment will be discussed from the point of view of two main contexts: that of the research participant with MS who completed the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre, and that of the context of the aquatic physiotherapy programme provided by the Burrswood Health and Wellbeing Centre. The key attributes mentioned in the definitions cited above have similarities with the findings of this research, whose participants developed a capacity independently to regulate and exert control over their day-to-day functions and activities. They also demonstrated changes in their self-management behaviour and participated in activities significant to them. The aquatic physiotherapy programme helped participants and facilitated empowerment.

The concept of empowerment is defined differently by different professionals (Aujoulat, d'Hoore, and Deccache, 2007), some evaluate empowerment as a process, others as an outcome. The extent and use of this term are wide-ranging. It is considered from the point of view of professionals, service providers and patients. One of the core attributes of the process of empowerment is the power of choice. The measures frequently used in the clinical studies, however, did not represent its exercise (Aujoulat, d'Hoore, and Deccache, 2007). The available evidence on the reliability and responsiveness of patient empowerment measures is significantly limited and there is a need clearly to define the constructs of empowerment (Barr, et al., 2015). For this reason, scholars have recommended future qualitative studies to explore the concept of empowerment (Barr, et al., 2015). There is also evidence to suggest that the use of concept of empowerment in Multiple Sclerosis (MS) may be outdated and incomplete. For instance, the principles of empowerment advocated by the consortium of MS care professionals based their recommendations simply on the self-efficacy and self-actualisation literature (Harris, et al., 2003). Besides their recommendations were delimited to few constructs, they were also published more than 15 years ago. Therefore, there is a need for more up to date understanding of this concept.

9.4 Grounded Theory Literature Review Question

What are the perspectives of people with Multiple Sclerosis about the components of their empowerment?

To answer this review question, the following three objectives were set for the Grounded Theory literature review:

1. To identify qualitative research and concepts that are fit and relevant to the components of empowerment of people with MS.
2. To produce synthesised findings using Joana Briggs Institute Meta-Aggregation analysis.
3. To critically appraise the research and then integrate, link and discuss their findings with the components of empowerment found in this doctoral research.

Keywords: Empowerment, Multiple Sclerosis, Aquatic Physiotherapy.

9.5 Inclusion Criteria

Types of participant

Participants in the research should be people with Multiple Sclerosis. The inclusion is open to any type of MS. There are no restrictions of gender, level of disability or duration of MS. The minimum age of participants should be 18 years.

Phenomenon of interest

Components of Empowerment of people with Multiple Sclerosis.

The qualitative research that found components of empowerment in people with MS is considered. Although the main phenomenon of interest of research is not empowerment, it is included as long as the findings of the research identified concepts related to empowerment.

Intervention

Lack of evidence in the aquatic physiotherapy field necessitated widening the search strategy. Any form of intervention offered by trained professionals is considered, not just the limited to aquatic therapy offered by a physiotherapist.

Exploration of experience of people without any intervention is also considered.

Context

Settings could include any hospital, inpatient, outpatient, community or leisure centre.

Types of study

This review only considered studies that collected qualitative data. The review did not limit the qualitative studies to their methodological affiliation to any particular approach. Review was open to a wide range of approaches such as Phenomenology, Grounded Theory and Feminist research. Mixed-methods studies were considered as long as there is a clear distinction between the qualitative and quantitative data and data extraction for qualitative component is possible.

Exclusion criteria

- Studies that were not published in English.
- Expert opinion and research that were not published in peer reviewed journals
- Literature reviews
- Quantitative studies.

9.6 Search Strategy

The literature search was not restricted to any historical timeline. Online searches were completed on four occasions (July 2017; March 2018; June 2018; May 2019) to keep up to date with recent developments in the field of empowerment and Multiple Sclerosis. A revised search with a refined focus on empowerment was completed in May and was repeated in November 2019 to check for any updates.

To standardise the online search strategy a set of key words pertinent to the focus of this research was identified. The key words used in completing the online searches were: 'empowerment' AND 'multiple sclerosis' AND 'aquatic' OR 'aquatic rehabilitation' OR 'aquatic exercise' OR 'hydrotherapy' OR 'aquatic physiotherapy'. A combined search for these key words did not return any results (n = 0) from the major online databases (AMED - The Allied and Complementary Medicine Database; APA PsycNET (PsychINFO) - American Psychological Association database; CINAHL Plus - Cumulative Index to Nursing and Allied Health Literature; SPORTDiscus; Medline). PubMed (United States National Library of Medicine) search using the combination of 'physiotherapy' AND 'multiple sclerosis' AND 'empowerment' returned only 4 results. Further scrutiny of these 4 results identified only one of them as relevant to this review.

Lack of enough evidence in this specific field necessitated widening the search strategy. The researcher used different combinations of key words: 'empowerment AND multiple sclerosis' AND 'physiotherapy' OR 'physical therapy' OR 'rehabilitation'. The researcher also performed searches using only key words: 'empowerment AND multiple sclerosis'.

Information Sources

The online search for literature was completed by using the following internet databases:

- AMED - The Allied and Complementary Medicine Database
- APA PsycNET (PsychINFO) - American Psychological Association database
- CINAHL Plus - Cumulative Index to Nursing and Allied Health Literature
- Cochrane Central Register of Controlled Trials CENTRAL
- PEDro - Physiotherapy Evidence Database
- PubMed - United States National Library of Medicine
- SPORTDiscus

Study Selection

Initial search results were screened for relevant literature by going through their titles and abstracts using the inclusion and exclusion criteria. Results were classified in two broad categories: relevant research, and irrelevant material. After excluding the latter the full text of each relevant item was read and reread.

Endnote™ software (version X8) by Clarivate Analytics (previously Thomson Reuters) was used in sorting the search results, removing duplicates, organising and saving references. The full text articles electronic files were attached to the endnote reference library.

Possibly relevant studies were retrieved in full and their citation details imported to the Joanna Briggs Institute System for the Unified Management, Assessment and Review of Information (JBI SUMARI) (Joanna Briggs Institute, Adelaide, Australia).

The articles that were not accessible in full text by using University databases were ordered by using the inter library loan request facility available at the researcher's place of work and study libraries. Additional hand search for articles was conducted by going through the reference lists included in publications. A detailed search strategy with the results is presented by using an adapted version of Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flow diagram (Figure 7).

Assessment of Methodological Quality

The methodological quality of the qualitative studies was assessed by using the standard Joanna Briggs Institute Critical Appraisal Checklist for Qualitative research (Lockwood, et al., 2017). The following 10 questions were used in evaluating the quality of research evidence.

Q1. Is there congruity between the stated philosophical perspective and the research methodology?

Q2. Is there congruity between the research methodology and the research question or objectives?

Q3. Is there congruity between the research methodology and the methods used to collect data?

Q4. Is there congruity between the research methodology and the representation and analysis of data?

Q5. Is there congruity between the research methodology and the interpretation of results?

Q6. Is there a statement locating the researcher culturally or theoretically?

Q7. Is the influence of the researcher on the research, and vice- versa, addressed?

Q8. Are participants, and their voices, adequately represented?

Q9. Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?

Q10. Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?

9.7 Data Extraction

The data from the qualitative research articles selected for this review were extracted by using the standardised qualitative data extraction tool recommended by Joanna Briggs Institute. The data extraction included authors, year of publication, methodology, method (Qualitative research aspect), phenomena of interest, setting, geographical, cultural, participants, data analysis, authors conclusions (relevant to empowerment).

9.8 Data Synthesis

Data synthesis was completed by using meta-aggregate synthesis procedures recommended by 'The Joanna Briggs Institute' (Lockwood, et al., 2017). JBI SUMARI software was used for completing these procedures. Synthesis of the qualitative review was completed using the following steps:

Step 1: Researcher extracted relevant findings from the included qualitative research articles. The findings are the verbatim extracts of the results and/or data of the previously completed qualitative studies. The extracted findings were relevant to the phenomena under review.

Step 2: The findings identified from different papers were pooled together to develop new categories. This aggregation process depended on the similarity of meaning assigned to the findings.

Step 3: The categories were then aggregated together to produce a single 'synthesised finding' that could be used for generating recommendations. Each synthesised finding was used to convey the meaning of a group of categories that are similar in their attributes.

The findings that were either unequivocally supported by participant quotes (U = Unequivocal) or credibly developed from the data analysis (C = Credible) were included in this synthesis. The findings that were not developed from the data or analysis of the qualitative research were considered as not credible (N = Not supported) and were not included in the synthesis.

9.9 Results

Study inclusion

Following the initial database screening, 269 records were identified. No additional sources were searched and no additional records were included. 111 records were identified as duplicates and therefore removed from screening. Titles and abstracts were screened to decide the eligibility of 158 records for further screening. On the exclusion criteria 119 records were excluded. After this screening 39 references were found to be eligible for further screening. These 39 full text articles were read for suitability for inclusion. Following this process, 28 articles were excluded. The search results and the reasons for exclusion are mentioned in the adapted PRISMA flow chart (Figure 7). At the end of the literature search a total of 11 articles were found to be 'relevant and fit' for the purpose of the Grounded Theory literature review and were included in the meta-aggregative synthesis.

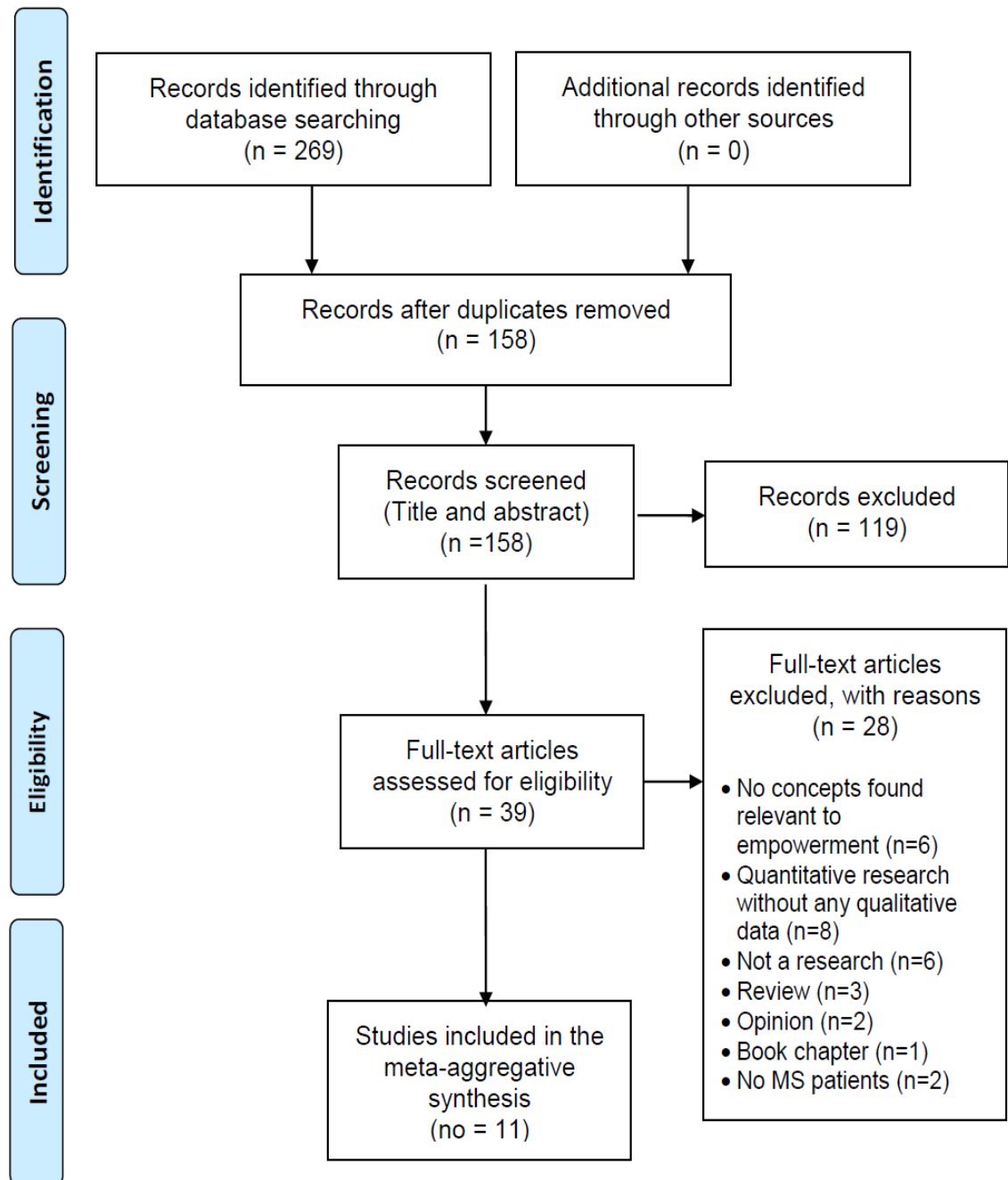


Figure 7: PRISMA flowchart for Grounded Theory literature review

Adapted from: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med* 6(7): e1000097. doi:10.1371/journal.pmed1000097

Characteristics of the included studies

Table 11 summarises the characteristics of the included studies. Out of the 11 qualitative studies included in this review 2 used mixed methods design, one used questionnaire with structured and open-ended questions and the rest of the 8 studies used qualitative research design. 2 of those qualitative studies used a Phenomenological approach, one used Grounded Theory and 5 indicated that they used qualitative research design but did not specify their association with any specific approach.

There are differences in the ways they collected data. The majority (9 out of 11) of the included studies used interview as their data collection method. Online blogs were used by one study. One study combined two methods of collecting data. In addition to interview this study used online survey. Half of the studies that incorporated interviews used focus groups in collecting data. Studies used different types of data analysis procedure. Five studies used Thematic Analysis, two studies used Constant Comparative Analysis methods and one study combined Content and Thematic Analysis and three used Content Analysis. Although all of the included studies have elements of empowerment in their findings only one of them specifically explored empowerment as their phenomenon of interest.

The total number of MS patients included in these qualitative studies was 318. One study also included people with other chronic conditions among their participants and did not indicate how many of their participants have MS (Audulv, et al., 2009). Because this study did not clearly specify, their participant numbers could not be included in the total number of MS patients.

Critical Appraisal Results

Critical appraisal results of the 11 studies were presented in the Table 12. Seven out of 11 studies did not meet all the criteria. Nine studies met more than 50% of the criteria. The influence of the researcher on the research was only reported in 5 out of the 11 studies.

Authors and Year	Methodology	Qualitative Method	Phenomena of interest	Setting	Geographical	Cultural	Participants	Data Analysis	Authors Conclusions
Aubrey and Demain, 2012	Qualitative research	Semi-structured focus group discussion	Community-based exercise group	Community	South of England	Not reported	25 people with MS	Thematic Analysis	Group community interventions have the potential to meet the varying and long-term rehabilitation needs of PwMS
Audulv, et al., 2009	Grounded Theory	Interviews	Self-management	Clinical setting	Sweden	Not reported	MS = not stated (26 variety of chronic illnesses including MS)	Constant Comparative Analysis	The process of negotiating self-management is an ongoing inner debate rather than a one-time decision
Block, et al., 2010	Mixed Methods	Semi-structured interviews	Perceived barriers, goals, and goal attainment	Community	North eastern state, USA	Not reported	9 people with MS	Content and thematic discourse analysis	Changes observed and reported in areas of intrapersonal, interpersonal, and behavioural functioning that indicated greater personal empowerment
Broadbent and Swalwell, 2019	Qualitative Research	Online Blogs	Psychosocial outcomes of the 'Oceans of Hope' project	Outdoor sailing activity	Scotland, Netherlands, Canada, Denmark, Iceland, Venezuela,	Not reported	94 people with MS	Deductive thematic analysis	Numerous psychosocial benefits are achievable when individuals with multiple sclerosis

					Germany, United Kingdom, New Zealand, Australia, United States of America, Spain, Belgium, Sweden, Austria, Portugal, and Norway.				are provided with opportunities and support to challenge themselves.
Clarke and Coote, 2015	Qualitative research design	Focus groups	perceptions of people with multiple sclerosis of a community based, group exercise programme	Community	Ireland	Irish	14 people with MS	Thematic analysis	The psychological benefits included the role of the group as a social and motivational factor, empowerment, confidence, hope, sense of achievement, and pride. Knowledge gained caused a shift from thoughts that exercise might do harm, to sufficient knowledge that would give participants confidence to

									exercise themselves
Courts, Buchanan and Werstlein, 2004	Qualitative research design	Focus groups	Lived experiences of people with MS and examine their needs from their perspectives	Community	Southern state, USA	Not reported	10 people with MS	Thematic analysis	Their most poignant need was someone to listen and teach since they identified knowledge as power. The data gathered contribute to knowledge and understanding of people living with MS. Findings support nursing interventions that empower and teach self-management techniques
Leino-Kilpi, Luoto and Katajisto, 1998	Questionnaire with structured and open-ended questions	Survey	Elements of empowerment	Rehabilitation centre	Finland	Finnish	64 people with MS	Content analysis	Home health services and a helpful social network contribute to patient empowerment.
Skår, et al., 2014	Phenomenological perspective	Focus Groups semi-structured interview	Experience participating in inpatient rehabilitation, and how it might provide psychosocial benefits	Inpatient rehabilitation	Norway and on Tenerife	Not reported	10 people with MS	Qualitative content analysis	We recommend health care professionals to acknowledge the importance of peer support for self, identity and

									empowerment in MS.
Synnot, et al., 2016	Qualitative study design, with an interpretivist framework	Focus group ($n = 27$) or the online forum ($n = 33$)	Integrating treatment information into decision making, in the context of searching on the Internet.	Community	Australia	Not reported	51 people with MS+ nine family members	Thematic analysis	People with MS have developed a number of strategies to both find and integrate treatment information from a range of sources
Thornton and Lea, 1992	Mixed methods	Interviews	Needs of People Living with Multiple Sclerosis	Home environment	Cape Town, South Africa	South African	33 people with MS	Content Analysis	It is felt that information-both about their disease condition and of support structures-needs systematically to be available and accessible to patients on diagnosis, and is a necessary component for empowerment.
Twomey and Robinson, 2010	Phenomenological perspective	Semi-structured, open-ended interview protocol	Community-based fatigue management programme	Community	Ireland	Not reported	8 people with MS	Constant comparative analysis	Participants experienced ownership, active participation and empowerment. Participants' experience of the community-based

									fatigue management programme was described in positive terms with unanticipated benefits and outcomes described
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Table 11: Characteristics of the included studies in the Grounded Theory Literature Review

Citation	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Dependability Score
Aubrey, 2012.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	5
Audulv, et al., 2009	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	5
Block, et al., 2010	U	U	Y	Y	Y	N	N	Y	N	U	2
Broadbent and Swalwell, 2019	U	Y	Y	Y	Y	N	N	Y	Y	Y	3
Clarke and Coote, 2015.	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	4
Courts, Buchanan and Werstlein, 2004.	Y	Y	Y	Y	Y	N	N	Y	Y	Y	3
Leino-Kilpi, Luoto and Katajisto, 1998.	U	Y	Y	Y	Y	N	N	Y	U	Y	3
Skår, 2014.	Y	Y	Y	Y	Y	N	N	Y	Y	Y	3
Synnot, et al., 2016	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	5
Thornton and Lea, 1992.	U	Y	Y	U	U	N	N	Y	U	Y	4
Twomey, 2010.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	5

Table 12: Critical appraisal results of the included studies in the Grounded Theory Literature Review

Key: Y=Yes. N=No, U= Unclear, N/A=Not applicable. Credibility score=Q2+Q3+Q4+Q6+Q7. Q1. Is there congruity between the stated philosophical perspective and the research methodology? Q2. Is there congruity between the research methodology and the research question or objectives? Q3. Is there congruity between the research methodology and the methods used to collect data? Q4. Is there congruity between the research methodology and the representation and analysis of data? Q5. Is there congruity between the research methodology and the interpretation of results? Q6. Is there a statement locating the researcher culturally or

theoretically? Q7. Is the influence of the researcher on the research, and vice- versa, addressed? Q8. Are participants, and their voices, adequately represented? Q9. Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body? Q10. Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?

9.10 Review Findings

Figure 8 displays a meta-aggregative overview flowchart that presents an overview of the steps and summary of the outcomes of this qualitative systematic review. Total 42 findings from the included qualitative studies are identified as 'relevant and fit' to the phenomenon of empowerment in people with MS. Meta-aggregation of similar findings from different studies contributed to the development of 8 categories. These are perceived control, motivation control, positive attitude, realising potential, interactions with peers and professionals, enablement, coping and participation. Further meta-aggregation of categories resulted in 3 synthesised findings: 1) Intrapersonal components: Empowerment of people with MS can be associated with the intrapersonal qualities of perceived control, motivation control, positive attitude and realising potential. 2) Interactional components: Empowerment process of people with MS can be facilitated by the interactions with peers and professionals and enablement. 3) Behavioural components: Empowerment in people with MS can be represented by the behaviours such as active coping, and participation.

Synthesised Finding 1: Intrapersonal components

Empowerment of people with MS can be associated with the intrapersonal qualities of perceived control, motivation control, positive attitude and realising potential.

The synthesised finding on the intrapersonal attributes of empowerment in people with MS was developed from the aggregation of 4 categories. These were perceived control, motivation control, positive attitude and realising potential. 22 findings were extracted in this literature review from all 11 studies that contributed to the development of 4 categories. While 15 findings were rated as unequivocal and 7 were rated as credible. Table 13 presents the list of these findings (authors), their rating, categories and synthesised finding.

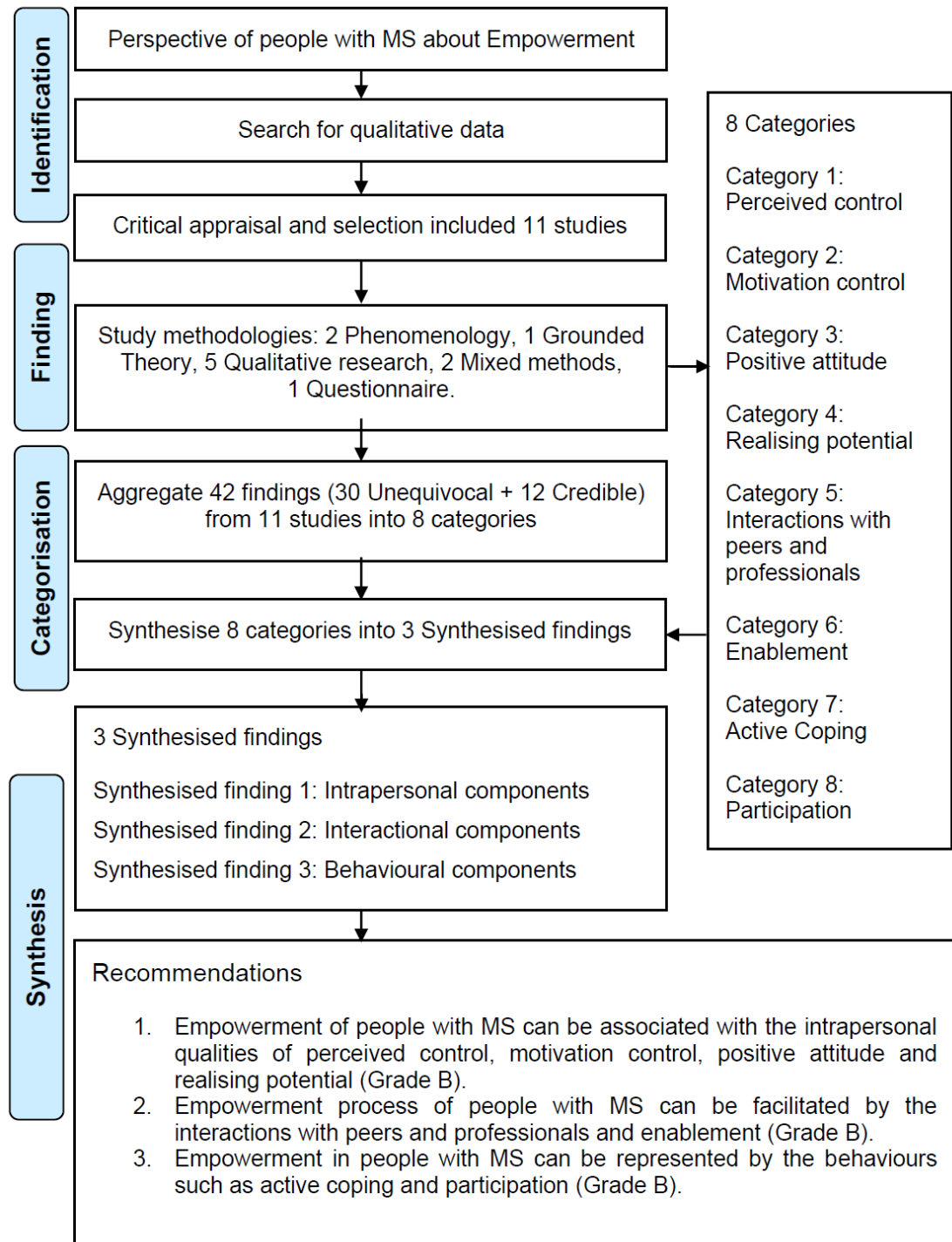


Figure 8: Meta-Aggregative Overview Flowchart of Grounded Theory Literature Review

Synthesised Finding 2: Interactional components

Empowerment process of people with MS can be facilitated by the interactions with peers and professionals and enablement.

The synthesised finding on the interactions, critical awareness and enablement components of empowerment in people with MS was developed from the aggregation of 2 categories. These were Interactions with peers and professionals, and enablement. 11 findings were extracted in this literature review from 6 studies (Aubrey and Demain, 2012; Clarke and Coote, 2015; Leino-Kilpi, Luoto and Katajisto, 1998; Skår, et al., 2014; Synnot, et al., 2016; Twomey and Robinson, 2010) that contributed to the development of 2 categories. While 9 findings were rated as unequivocal and 2 were rated as credible. Table 14 presents the list of these findings (authors), their rating, categories and synthesised finding.

Synthesised Finding 3: Behavioural components

Empowerment in people with MS can be represented by the behaviours such as active coping and participation.

The synthesised finding on the behavioural attributes of empowerment in people with MS was developed from the aggregation of 2 categories. These were active coping and participation. 9 findings were extracted in this literature review from the qualitative data of 6 studies Taking action through exercise is empowering (Aubrey and Demain, 2012; Block, et al., 2010; Clarke and Coote, 2015; Leino-Kilpi, Luoto and Katajisto, 1998; Skår, et al., 2014; Twomey and Robinson, 2010). These findings contributed to the development of 2 categories. These are participation and active coping. While 6 findings were rated as unequivocal and 3 were rated as credible. Table 15 presents the list of these findings (authors), their rating, categories and synthesised finding.

No	Findings	Rating	Category	Synthesised Finding 1	
1	Sense of control (Aubrey and Demain, 2012)	C	Perceived Control	Intrapersonal components: Empowerment of people with MS can be associated with the intrapersonal qualities of perceived control, motivation control, positive attitude and realising potential.	
2	Having control (Broadbent and Swalwell 2019)	C			
3	Gaining control (Clarke and Coote, 2015)	U			
4	Sense of control (Courts, Buchanan and Werstlein, 2004)	U			
5	Control links to knowledge (Leino-Kilpi, Luoto and Katajisto, 1998)	C			
6	Information helps to take control (Thornton and Lea, 1992)	C			
1	Decreased motivation (Aubrey and Demain, 2012)	U	Motivation Control		
2	Motivators for self-management (Audulv, et al., 2009)	U			
1	Developing positive attitude (Aubrey and Demain, 2012)	U	Positive Attitude		
2	Adopting positive ‘can do’ attitude (Aubrey and Demain, 2012)	U			
3	Changing perceptions (Block, et al., 2010)	C			
4	Changing perceptions about ability (Broadbent and Swalwell 2019)	C			
5	Changing attitude (Courts, Buchanan and Werstlein, 2004)	U			
6	Changing attitude (Skår, et al., 2014)	U			
1	Education changed perceptions (Block, et al., 2010)	U	Realising Potential		
2	Realising they can do more (Broadbent and Swalwell 2019)	U			
3	Knowledge is empowering (Clarke and Coote, 2015)	U			
4	Knowledge is power (Courts, Buchanan and Werstlein, 2004)	U			
5	Knowledge building (Synnot, et al., 2016)	U			
6	Knowledge is power (Synnot, et al., 2016)	U			
7	Information is empowering (Thornton and Lea, 1992)	C			
8	Knowledge changes thinking (Twomey and Robinson, 2010)	U			

Table 13: Synthesised Finding 1: Intrapersonal components

No	Findings	Rating	Category	Synthesised Finding 2
1	Support of peers is empowering (Aubrey and Demain, 2012)	U	Interactions with peers and professionals	Interactional components: Empowerment process of people with MS can be facilitated by the interactions with peers and professionals and enablement.
2	Learning from peer interaction (Aubrey and Demain, 2012)	U		
3	Social interactions with peers (Leino-Kilpi, Luoto and Katajisto, 1998)	U		
4	Peer interactions (Skår, et al., 2014)	U		
5	Peer motivation improved potential (Skår, et al., 2014)	U		
6	Information from other patients (Synnot, et al., 2016)	C		
7	Group association is empowering (Twomey and Robinson, 2010)	U		
8	Empowering partnership (Twomey and Robinson, 2010)	U		
9	Partnership is empowering (Twomey and Robinson, 2010)	U		
1	Increased ability (Clarke and Coote, 2015)	U	Enablement	
2	Benefits transferring to life domains (Clarke and Coote, 2015)	C		

Table 14: Synthesised Finding 2: Interactional components

No	Findings		Category	Synthesised Finding 3
1	Taking action through exercise is empowering (Aubrey and Demain, 2012)	U	Active Coping	Behavioural Components: Empowerment in people with MS can be represented by the behaviours such as active coping, and participation.
2	Exercising to maintain (Aubrey and Demain, 2012)	U		
3	Actively managing (Clarke and Coote, 2015)	U		
4	Learning to cope (Skår, et al., 2014)	U		
5	Making changes (Twomey and Robinson, 2010)	U		
1	Participation in exercise empowers (Aubrey and Demain, 2012)	C	Participation	
2	Provide opportunities for participation (Block, et al., 2010)	C		
3	Social participation linked to sense of empowerment (Leino-Kilpi, Luoto and Katajisto, 1998)	C		
4	Participation in social activities (Skår, et al., 2014)	U		

Table 15: Synthesised Finding 3: Behavioural Components

ConQual Score of the findings

Meta-aggregative approach uses the criteria of credibility and dependability to assess the level of evidence and the usefulness of the findings (Munn, et al., 2017). Credibility of the qualitative findings are assessed on the level of findings that supported the development of the synthesised findings. If all the findings extracted from the qualitative research are Unequivocal, then the credibility is rated as High. If the findings are a mix of Unequivocal and Credible then the level of credibility is downgraded and considered as moderate. The combination of Credible and Non-supported findings is downgraded to low. The 3 synthesised findings developed from this literature review are supported by the combination of Unequivocal and Credible findings. Therefore, the credibility rating of the synthesised findings is graded as moderate.

The dependability score of the qualitative research is made from the responses of the Critical Appraisal Checklist questions (see Table 12). Out of the 10 questions only 5 of them are considered for the dependability score. These are Q2, Q3, Q4, Q6 and Q7, Majority of the included studies did not achieve a score for some of these questions. This meant the dependability score of the synthesised findings are downgraded to very low. The combination of dependability and credibility has resulted in a low ConQual score for all the synthesised findings. Therefore, the recommendation presented are considered as weak (Grade B).

Recommendations from the literature review

1. Empowerment of people with MS can be associated with the intrapersonal qualities of perceived control, motivation control, positive attitude and realising potential (Grade B).
2. Empowerment process of people with MS can be facilitated by the interactions with peers and professionals and enablement (Grade B).
3. Empowerment in people with MS can be represented by the behaviours such as active coping and participation (Grade B).

The ConQual summary of findings is presented in the Table 16. The synthesised findings of this Grounded Theory literature review will be integrated into the findings of the grounded theory research. The discussion of these will be presented in the following chapter (See Chapter 10).

Systematic review title: Perspectives of people with Multiple Sclerosis about their own Empowerment. Population: People with Multiple Sclerosis. Phenomena of interest: Empowerment. Context: Any therapy or non-therapy setting.					
Synthesised findings	Type of research	Dependability	Credibility	ConQual Score	Comments
Synthesised finding 1: Intrapersonal qualities Empowerment of people with MS can be associated with the intrapersonal qualities of perceived control, motivation control, positive attitude and realising potential.	Qualitative	Very Low (downgraded two levels)	Moderate (downgraded one level)	Low	Dependability was downgraded two levels because majority of the studies scored poorly for Q6 and Q7. Credibility was downgraded one level because of the mix of Unequivocal and credible findings (15 U + 7 C).
Synthesised finding 2: Interactional components Empowerment process of people with MS can be facilitated by the interactions with peers and professionals and enablement.	Qualitative	Very Low (downgraded two levels)	Moderate (downgraded one level)	Low	Dependability was downgraded two levels because majority of the included studies scored poorly for Q6 and Q7. Credibility was downgraded one level because of the mix of Unequivocal and credible findings (9 U + 2 C).
Synthesised finding 3: Behavioural components Empowerment in people with MS can be represented by the behaviours such as active coping, and participation.	Qualitative	Very Low (downgraded two levels)	Moderate (downgraded one level)	Low	Dependability was downgraded two levels because majority of the included studies scored poorly for Q6 and Q7. Credibility was downgraded one level because of the mix of Unequivocal and credible findings (6 U + 3 C).

Table 16: ConQual Summary of Findings

Chapter 10

Discussion

Chapter 10: Discussion

The primary focus of this discussion chapter will be the concept of *Empowerment* because it was found to be the core category in this research. The categories of *Realising Potential*, *Positive Attitude* and *Enablement* in combination worked to explain *Empowerment* as the overarching core category of the findings. The research participants of this study, people with Multiple Sclerosis (MS), gained empowerment as the carry-over benefit of the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre. Therefore, this discussion will explore the findings from the context of the research participants with MS, and the aquatic physiotherapy programme of the Burrswood Health and Wellbeing Centre. Besides empowerment's being the outcome of the aquatic physiotherapy programme, the inductive model developed in the findings chapter (see Figure 6) also suggested that '*empowering*' is a process through which research participants gained greater control over the problems of their MS. Accordingly the concept of empowerment found in this research will be discussed both as a process and product.

The content of the discussion chapter is organised in two sections. The first section will present evaluation of different theoretical frameworks of empowerment and explain the reasons for selecting Zimmerman's Theoretical Framework of Individual Psychological Empowerment (Zimmerman, 1995; 2000) for conceptualising the findings of this research. The second section presents a novel Burrswood Conceptual Framework of Empowerment with its Intrapersonal, Interactional and Behavioural components. The discussion presented in this chapter will evaluate, integrate and synthesise the findings of the current study with the components of Zimmerman's Theoretical Framework of Individual Psychological Empowerment. This discussion will also include the findings of the Grounded Theory literature review. This discussion will expand understanding of the concept of empowerment and the categories found in this research by comparing and linking them with the Zimmerman's Theory of Individual Psychological Empowerment (Zimmerman, 1995; 2000) and other key concepts of MS patient's empowerment found in the Grounded Theory literature review.

The discussion aims to develop new knowledge, identify gaps in current knowledge and generate new hypotheses concerning the concept of empowerment, aquatic physiotherapy and MS. The discussion will critically evaluate the suitability of the

Zimmerman's theoretical framework of psychological empowerment (Zimmerman, 1995; 2000) and present a justification for the development of a new framework for the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre. A novel Burrswood Conceptual Framework of Empowerment will be presented that may be suitable for the aquatic physiotherapy programme for people with MS at the Burrswood Health and Wellbeing Centre and any other services that offering similar programmes for people with MS. The discussion in this part will also link the categories found in this research with the findings of the Grounded Theory literature review and offer explanation for the different components of the Burrswood Conceptual Framework of Empowerment and discuss their association and relevance to the findings of this research.

10.1 Theoretical Framework for Conceptualising the Findings

To the best of researcher's knowledge, empowerment theory is not commonly used in routine physiotherapy practice for people with MS. This view of the researcher is reinforced by the lack of prior evidence or guidance on this topic. Moreover, the researcher also did not find any literature that demonstrated an affiliation to a specific theoretical model of empowerment in the field of physiotherapy for MS. To better understand the concept of empowerment and conceptualise the findings of the current research, it was deemed necessary to evaluate these by using an existing theoretical framework of individual empowerment. Theoretical models are necessary to understand the complex behaviour phenomenon such as empowerment (Kosciulek and Merz, 2001).

Literature search for theories of empowerment found different empowerment theories from a wide range of sectors. Some of these are from political, socio-economic, business, employment, organisation and community sectors. Individual empowerment is a contextual-behaviour phenomenon and the meaning of which will be influenced by the context and personal expectations (Fawcett, et al., 1994; Frain, Bishop and Tschopp, 2009). Moreover, the process of empowerment is considered to be unique and perceived differently by different individuals based on their context and personal circumstances (Block, Balcazar, and Keys, 2001). Therefore, theoretical models from political, socio-economic, business, employment and community sectors will not be suitable for explaining and integrating the individual components of empowerment found in this research. The researcher did not find an empowerment theoretical framework that is specifically recommended for people with MS. Therefore, other suitable empowerment theoretical frameworks from the health care sector are considered.

Empowerment theories that are not relevant to health sector and not related to individual level of empowerment were considered unsuitable for this research. For instance, Spreitzer's theory of psychological empowerment of employees in the workplace (Spreitzer, 1995) and Kanter's Structural Empowerment theory relating to structural power in organisations (Miller, Goddard and Laschinger, 2001) were not considered for this research.

Because the concept of empowerment found in this research is associated with the research participant at an individual level, it is important to focus discussion and analysis at the level of the individual. While there are few patient empowerment conceptual frameworks available, Zimmerman's Theoretical Framework of Individual Psychological Empowerment was found to be suitable for conceptualising the findings of this research (Zimmerman, 1995; 2000). The following discussion in this section will consider some of the prominent empowerment theoretical frameworks and models reported in the health care research. The discussion will explain the reasons for not selecting the Contextual-behavioural Model of Empowerment (Fawcett, et al.,1994), Consumer-directed Theory of Empowerment (Kosciulek,1999), Self-advocacy Model of Empowerment (Miller and Keys, 1996), and Health Empowerment Theory (Shearer, 2009). The discussion will explain the reasons for selecting Zimmerman's Theoretical Framework (Zimmerman, 1995; 2000) for this research.

A contextual-behavioural model developed by Fawcett and colleagues proposed community empowerment strategies for people with physical disabilities (Fawcett, et al.,1994). Although the target population of their model have some similarities to the research participants of the current research, majority of the strategies proposed by their model are directed at community coalition. For instance, though the strategy for enhancing competence is aimed at individual, strategies for enhancing support and resources are more directed towards community. This model did not provide adequate information about different components of individual empowerment. For the preceding reasons, contextual-behavioural model was not considered suitable for explaining the process of individual empowerment found in the current research.

The Consumer-directed theory of empowerment provides guidance related to involving consumers in the development of disability policies and rehabilitation services (Kosciulek and Merz., 2001). It is intended to evaluate and improve the delivery of rehabilitation services by involving persons with disabilities. Therefore, the framework advocated by the Consumer-directed theory of empowerment is not specific enough for explaining the

process of empowerment at an individual level. Hence, it is not suitable for the purpose of this research.

A self-advocacy model of empowerment proposed four stages of personal empowerment for people with developmental disabilities (Miller and Keys, 1996). The first stage of empowerment suggested by this model focuses on individual gaining awareness of societal discrimination and understanding their legal rights. Although Miller and Keys (1996) model of empowerment emphasised individuals' strengths, knowledge, competence and collaboration, it did not provide adequate details on different components of individual empowerment. Besides, their model is also aimed at challenging societal discrimination by the marginalised, which is not a relevant concept to the findings of the current research. For the preceding reasons, it is not considered to be a suitable framework for this research.

On the initial observation, Health Empowerment Theory (Shearer, 2009) seemed relevant to the current research. However, close scrutiny of its framework suggested that it did not explicate different components of psychological empowerment at the individual level. Health Empowerment Theory was developed from the data gathered from homebound older adults with chronic conditions. The primary purpose of Health Empowerment framework is to improve the perceived level of well-being of older adults. The strategies advocated by this framework are aimed at improving the quality of intervention delivered by nurses working in community health setting. Although Health Empowerment framework provided some pertinent information about the individual components of empowerment, the theory has more emphasis towards social and contextual factors. Health Empowerment Theory did not explicate and provide enough detail on the different components of individual level of empowerment. Therefore it is not considered to be suitable for this research.

Zimmerman developed a theoretical framework (see Figure 9) within which to explain the psychological empowerment at the individual level (Zimmerman, 1995; 2000). Unlike other theoretical frameworks, Zimmerman's Theoretical Framework of Individual Psychological Empowerment provided better understanding of the different components of empowerment at the level of the individual (Johnsen, et al., 2017). Although Zimmerman's framework acknowledges the interdependence of individual empowerment with their community, the main emphasis of this framework is on the psychological empowerment of the individual (Perkins and Zimmerman, 1995). Compared with other models of empowerment, Zimmerman's framework is considered

to be suitable for research and measurement because it specified variables and grouped them into components (Cattaneo and Chapman, 2010). It is also widely used in a range of research fields that explore the role of individual empowerment.

Zimmerman described individual empowerment as a psychological phenomenon (Zimmerman, 1995; 2000). Similar to Zimmerman's view, recent scholars also argued that patient empowerment is a cognitive process at the individual level (Kaladoudi and Makris, 2015). The findings of the current study also found components that strengthened Zimmerman's description. According to Zimmerman, the process of empowerment takes different forms for different people and varies according to context (Zimmerman, 1995; 2000). The skills and actions required to achieve empowerment differ according to motive, sociopolitical background and goals. Although the data excerpts found in the current study were analogous to these assumptions of Zimmerman's theory, it is important to consider the delimitation of this doctoral research. A limitation that is deliberately introduced in the research design to confine the focus of the study is known as delimitation (Price and Murnan, 2004). Because of the specific aim of this doctoral research the study recruited only people with Multiple Sclerosis who attended an aquatic physiotherapy programme at Burrswood Health and Wellbeing Centre. This meant the findings are influenced by the perceptions of a small group research participants from a single geographical region.

The empowerment process in the current study took a variety of forms and was linked to research participants' personal circumstances and interests. For example, even though Gemma's, Lara's and Karina's interests were different, and their activities represented different forms and contexts, they all demonstrated the process of empowerment. After attending the programme Gemma became confident in her physical and functional abilities to the extent that she joined a local public swimming pool and took up swimming as a form of regular exercise. Prior to attending the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre, Lara was unable to continue her work because of her debilitating MS but, due to the physical and psychological benefits achieved from the programme, she became more independent and returned to full-time employment. Improvements in muscle strength empowered Karina to take up childcare responsibilities of her preschool-aged grandchildren. The pattern of behaviour found in the current study supported Zimmerman's assumption that the process of empowerment takes different forms with different people (Zimmerman, 1995; 2000).

Zimmerman's theory described the concept of empowerment as process and product (Zimmerman, 1995; 2000) and similarly, as is a finding of this Classic Grounded Theory study. For the preceding reasons, Zimmerman's empowerment framework was considered a suitable framework within which to conceptualise the findings of this research. This discussion will evaluate, integrate and link the components of empowerment found in this research with the individual level components mentioned in the Zimmerman's Theoretical Framework of Individual Psychological Empowerment (Zimmerman, 1995; 2000). Further detailed discussion on the components and framework will be presented in the latter part of this chapter.

Zimmerman's theory assumed empowerment as a dynamic variable (Zimmerman, 1995; 2000). According to this assumption, people's perceptions of empowerment changed over time and were influenced by different factors. An individual's sense of empowerment can fluctuate from a feeling of disempowerment at one point to a feeling of full empowerment at another. The findings of the current study supported this assumption. Even though research participants were empowered, the feeling of exhaustion after aquatic exercise became a deterring factor for participation in further therapy. For example, Jemima was empowered enough to swim at the therapy Centre, but she lacked the confidence to continue swimming in a public pool and would not go because of exhaustion. Holly decided not to continue with any further aquatic sessions at the hospital because she did not want to feel so exhausted after each session.

Zimmerman's theory suggested that the empowerment process is influenced by context and population characteristics (Zimmerman, 1995; 2000). The diversity of research participants in the current study is not adequate to associating their characteristics with different empowering processes. All participants who demonstrated empowerment as a carry-over benefit of the aquatic physiotherapy programme were female. Brian was the only male and his responses did not contribute towards the development of the concept of empowerment. Lack of representation of male participants was one of the major limitations of this research. It is important for the researchers to acknowledge differences in the specific needs of men and women and adapt the interventions accordingly (Tannenbaum, Greaves and Graham, 2016). Although it was reasonable to assume that the mechanisms contributing to the empowerment process in this research could be generalisable to female participants with MS who completed the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre, it is important for future

research to look at the perspectives of male patients with MS about the carry-over effects of aquatic physiotherapy.

Activities associated with people's lives are commonly grouped into eight core domains. The most commonly reported life domains in the literature are personal development, participation, self-determination, social inclusion, rights, physical well-being, material and emotional well-being (Schalock and Verdugo, 2014). Each of these domains is made up of indicators which includes numerous activities pertinent to a person's life. The value attributed to a given domain can be associated with person's temperament. For example, a person might perceive material well-being as an important domain of their life and engages in the activities associated with it, while perceiving social inclusion as a relatively low-value domain and not engage enough. So, the relative value associated with different domains of life can differ among individuals.

According to Zimmerman, the meaning an individual associates with the concept of psychological empowerment can vary between domains (Zimmerman, 1995; 2000). It is possible that an individual might feel empowered in the physical well-being domain of their life, but not in the social inclusion domain. The current study also found excerpts in the data which demonstrated the association between the domains and intrapersonal qualities of empowerment. For example, some research participants expressed a sense of personal control over the problems caused by their MS and described empowerment in the self-determination domain of their lives. Some cited examples indicating their level of participation in the community and family activities which described their empowerment in the participation domain of their lives.

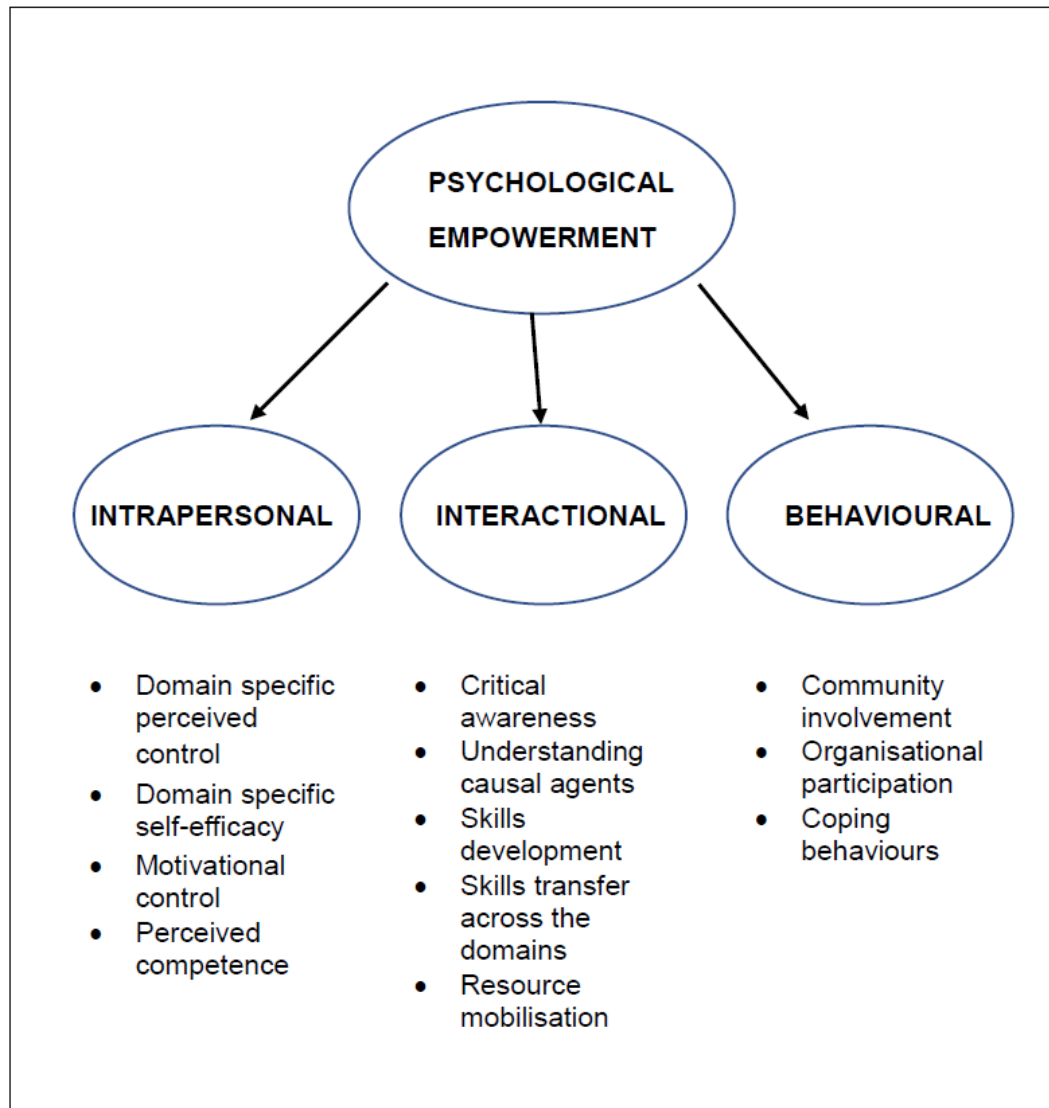


Figure 9: Zimmerman's Theoretical Framework of Individual Psychological Empowerment (Zimmerman, 1995, p.588)

10.2 Burrswood Conceptual Framework of Empowerment

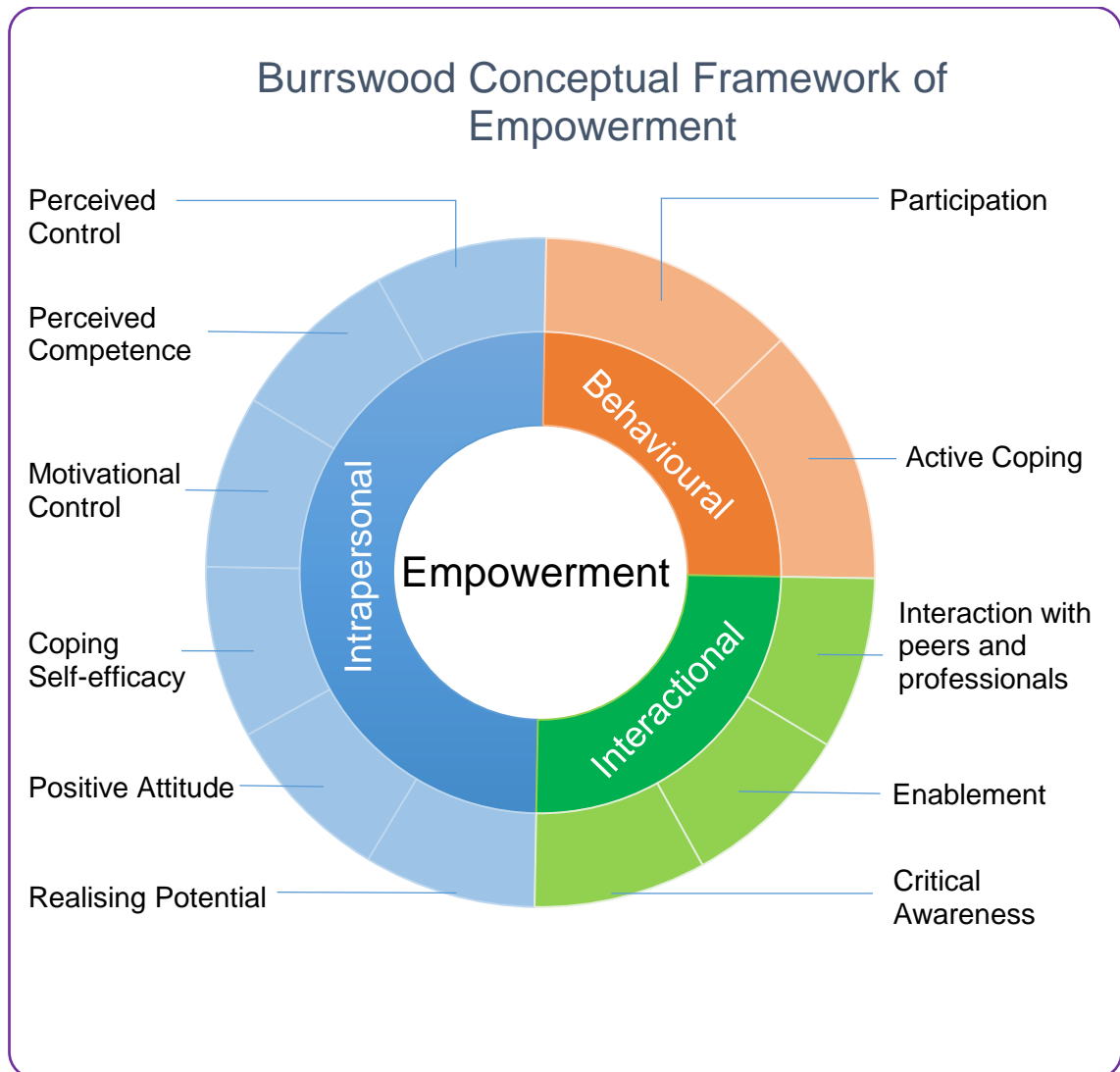


Figure 10: Burrswood Conceptual Framework of Empowerment

The conceptual framework (see Figure 6) presented at the end of the findings chapter was constructed by the researcher using inductive methods. The use of the Classic Grounded Theory approach assisted the exploration of the concept of carry-over effects from the perspective of and as reported by the participants. This approach facilitated the generation of a new conceptual framework that was not built on any pre-existing versions. The schematic model of the conceptual framework presented at the end of the findings chapter explained the steps involved in the development of core category of *Empowerment*, from the categories: *Realising Potential*, *Positive Attitude* and *Enablement*. The schematic model depicted the ideas and processes involved in empowerment. Graphic illustrations, for instance arrows, were used to depict and explain the direction of the relationship between the categories and their independent associations with the core category. The following discussion will compare the conceptual framework generated in the current study with Zimmerman's Theoretical Framework of Individual Psychological Empowerment (Zimmerman, 1995, p.588).

Similar to Zimmerman's theoretical framework (see Figure 9), the conceptual framework of this study also has three lower-order categories that are associated with the development of the higher-order core category of empowerment. Apart from this similarity, the schematic depiction and description of the models differ markedly. The direction of relationship depicted between the categories and the core category are completely opposite. For example, the direction of the arrows depicted in Zimmerman's framework (see Figure 9) suggested that the process originated from the higher-order empowerment and ended at the lower-order components (Zimmerman, 1995, p.588). On the contrary, the direction of arrows depicted in the conceptual framework (see Figure 6) of this research suggest that the process of empowerment originates in the lower-order categories and concludes with the construction of the higher-order core category on empowerment.

According to the Zimmerman's theory, psychologically empowered individuals manifested particular qualities that can be divided into Intrapersonal, Interactional and Behavioural components (Zimmerman, 1995; 2000). Zimmerman's theoretical framework is described as a superordinate model because it represents a cause-effect relationship between the higher-order construct of empowerment and the lower-order components of intrapersonal, interactional and behavioural qualities (Peterson, 2014). On the contrary, the conceptual framework developed in this research suggests that the higher-order construct of empowerment was an effect caused by the combined effect of the lower-order categories. This current study's framework suggested that the

relationships emanated from the categories of *Realising Potential*, *Positive Attitude*, and *Enabling* to the core category of *Empowerment*. Unlike Zimmerman's superordinate framework, the schematic model developed from the findings of this research suggested an aggregate relationship between the categories and the core category. On an aggregate model, the categories need not correlate with each other. The categories represent different aspects of the higher-order construct and therefore do not have similar antecedents and characteristics among them. The only mutual association between them is their relationship with the higher-order core category. In this research the categories differed in their antecedents, characteristics, attributes, however they helped participants to gain control over their lives and make changes to behaviour that characterised the process of empowerment.

The structure of Zimmerman's theoretical framework was criticised in the literature because it restricted further exploration of other potential variables that might also contribute to the process of empowerment (Peterson, 2014). The ambiguities observed in the results of Zimmerman's theory-based research were ascribed to errors in the schematic presentation of the framework (Peterson, 2014). The superordinate structure of Zimmerman's framework resulted in the development of numerous hypothetico-deductive studies that merely evaluated the components advocated. Instead of using a superordinate model, it would be appropriate to use an aggregate model to describe the higher-order multidimensional constructs such as empowerment (Peterson, 2014). For the above reasons Zimmerman's superordinate theoretical framework was deemed unsuitable for the current study, which necessitated the development of a new aggregate conceptual framework.

Similar to Zimmerman's theory of empowerment (Zimmerman, 1995; 2000), the participants in the current study also demonstrated Intrapersonal, Interactional and Behavioural components. However, there were differences in the attributes that contributed to the development of these components. Taking into the account the differences in the components of Zimmerman's theory and the findings of this research, the development of a new conceptual framework was deemed necessary. A novel Burrswood Conceptual framework of Empowerment (see Figure 10) in the form of a doughnut chart was designed to better represent all the attributes of empowerment found in this research and illustrate the aggregate association between the components and empowerment.

The aggregate theoretical framework developed in the current research adhered to the principles of induction and embraced the tenets of subjectivity. The framework of this research has potential for further development, advancement and modification of the core category. For example, expanding this research to a different substantive area, e.g. a supervised community fitness programme for people with Multiple Sclerosis, increases the possibility of finding new substantive codes and concepts. These concepts might generate new categories that have the potential to influence and modify the properties of the core category of empowerment.

The following discussion explains the development of the Burrswood Conceptual Framework of Empowerment and its components from the integration of findings of this doctoral research, components of Zimmerman's Theoretical Framework of Individual Psychological Empowerment and the findings of the Grounded Theory literature review.

10.2.1 Intrapersonal Components

The intrapersonal components of Zimmerman's Theoretical Framework of Individual Psychological Empowerment incorporated qualities relevant to personal beliefs such as perceived control, perceived competence, self-efficacy and personal attributes such as motivation (Zimmerman, 1995; 2000). Participants in this research also demonstrated personal beliefs and attributes similar to those in Zimmerman's theory. In addition to these, participants demonstrated three more intrapersonal qualities of empowerment. These were coping self-efficacy, positive attitude and realising potential, which were added to the new framework. This discussion presents a rationale for the addition of these to the intrapersonal components of empowerment.

The first Synthesised Finding of the Grounded Theory literature review also identified intrapersonal components of empowerment in people with Multiple Sclerosis. Empowerment of people with MS can be associated with the intrapersonal qualities of perceived control, motivation control, positive attitude and realising potential. Although the level of evidence supporting this synthesised finding is weak (Grade B), this finding suggested that the empowerment in people with Multiple Sclerosis can be associated with the intrapersonal qualities. The synthesised finding of intrapersonal components was developed from the categories of 'perceived control', 'motivation control', 'positive attitude' and 'realising potential'. These categories were developed from 22 findings (15

Unequivocal + 7 Credible) of the Grounded Theory literature review. These findings were extracted from 11 studies (Aubrey and Demain, 2012; Audulv, et al., 2009; Block, et al., 2010; Broadbent and Swalwell 2019; Clarke and Coote, 2015; Courts, Buchanan and Werstlein, 2004; Leino-Kilpi, Luoto and Katajisto, 1998; Skår, et al., 2014; Synnot, et al., 2016; Thornton and Lea, 1992; Twomey and Robinson, 2010).

There are some similarities and differences in the intrapersonal components of the Zimmerman's Theoretical Framework of Individual Psychological Empowerment, Burrowswood Conceptual Framework of Empowerment and the categories found in the Grounded Theory literature review. Table 17 presents a comparison between these three. The following discussion provides further explanation of those similarities and differences.

Although the categories developed in the Grounded Theory literature review have some similarity to the intrapersonal components of perceived control, motivation control, mentioned in the Zimmerman's framework the review did not find any categories supporting the perceived competence and self-efficacy mentioned in Zimmerman's framework. Both the Grounded Theory literature review and findings' as categories of empowerment. However, these were not mentioned in the Zimmerman's framework.

Intrapersonal components found in this research were activity-specific: therefore, the domain-specific associations cited in the Zimmerman's framework were replaced in the Burrowswood Conceptual Framework of Empowerment with the activity specific associations. The intrapersonal components of these frameworks are presented in the Table 17. The discussion in this section also presents a rationale for the suitability of intrapersonal components of the new framework to the aquatic physiotherapy programme at the Burrowswood Health and Wellbeing Centre.

Intrapersonal Components			
Burrswood Conceptual Framework	Grounded Theory Literature Review	Zimmerman Theoretical Framework	Comments
Perceived control and Perceived competence (Activity specific)	Perceived control	Perceived control and Perceived competence (Domain specific)	<ul style="list-style-type: none"> Although there is no difference in the meaning associated with the perceived control, Zimmerman's component is linked to domains whereas Burrswood's is linked to activities. Grounded theory literature review did not find any clear association with activity or domain.
Perceived competence (Activity specific)		Perceived competence (Domain specific)	<ul style="list-style-type: none"> Perceived competence category was not found in the Grounded Theory literature review. Although there is no difference in the meaning associated with the perceived competence, Zimmerman's component is linked to domains whereas Burrswood's is linked to activities.
Motivational control	Motivational control	Motivational control	No difference in the meaning.
Coping Self-efficacy (Activity specific)		Self-efficacy (Domain specific)	<ul style="list-style-type: none"> Self-efficacy category was not found in the Grounded Theory literature review. Although there is no difference in the meaning associated with the concept of self-efficacy, it is explicated in the Burrswood framework as an activity specific and coping type of self-efficacy.
Positive attitude	Positive attitude		<ul style="list-style-type: none"> Positive attitude is not mentioned in the Zimmerman's framework. There is no difference in the meaning related to positive attitude component of Burrswood's framework and Grounded Theory literature review.
Realising potential	Realising potential		<ul style="list-style-type: none"> Realising potential is not mentioned in the Zimmerman's framework. There is no difference in the meaning related to positive attitude component of Burrswood's framework and Grounded Theory literature review.

Table 17: Comparison of Intrapersonal Components of Empowerment in Grounded Theory literature review, Burrswood and Zimmerman's frameworks.

a) Perceived Control and b) Perceived Competence

Perceived control is defined

“as the belief that one can determine one’s own internal states and behaviour, influence one’s environment, and/or bring about desired outcomes” (Wallston, et al 1987., p 5).

Perceived Competence may be described as a person’s own beliefs or predictions concerning their abilities and performance. This may differ from their actual performance. Similar to Zimmerman’s theory (Zimmerman, 1995; 2000), this research also found personal beliefs of perceived control and competence to be the intrapersonal components of empowerment. Although GT literature review extracted findings that represented the intrapersonal component of perceived control in people with MS, no findings were available for perceived competence. The meta-aggregative flow chart presented in the next page shows the findings relevant to perceived control. As there were no findings relevant to perceived competence, a meta-aggregative flow chart could not be developed. The GT literature review extracted 6 findings from previous studies that represented the concept of perceived control in people with MS. The overall level of evidence supporting this component has been downgraded as moderate because the majority of these findings are not unequivocal (4=Credible and 2=Unequivocal). The meta-aggregative flow chart presented on the next page gives these details. Although none of the studies identified in the GT literature review is similar in purpose to this doctoral research, there were similarities in the perceived control reported by MS patients over their life and MS.

Learning, understanding and the enabling achieved from the aquatic physiotherapy programme improved the perceived control and competence of the participants over a wide range of their functional activities. For instance, improved confidence in the participants’ balance helped them to feel competent in their ability to stand and complete day-to-day functional tasks such as cooking. A qualitative study that explored MS patients experience of a sailing journey found that they became stronger and confident in their functional ability, which contributed to feelings of ‘having control’ over their MS (Broadbent and Swalwell 2019). Although the intervention of the sailing study is completely different from aquatic physiotherapy offered in this doctoral research, the findings from MS patients suggests that perceived control can be considered as an element of empowerment in people with Multiple Sclerosis.

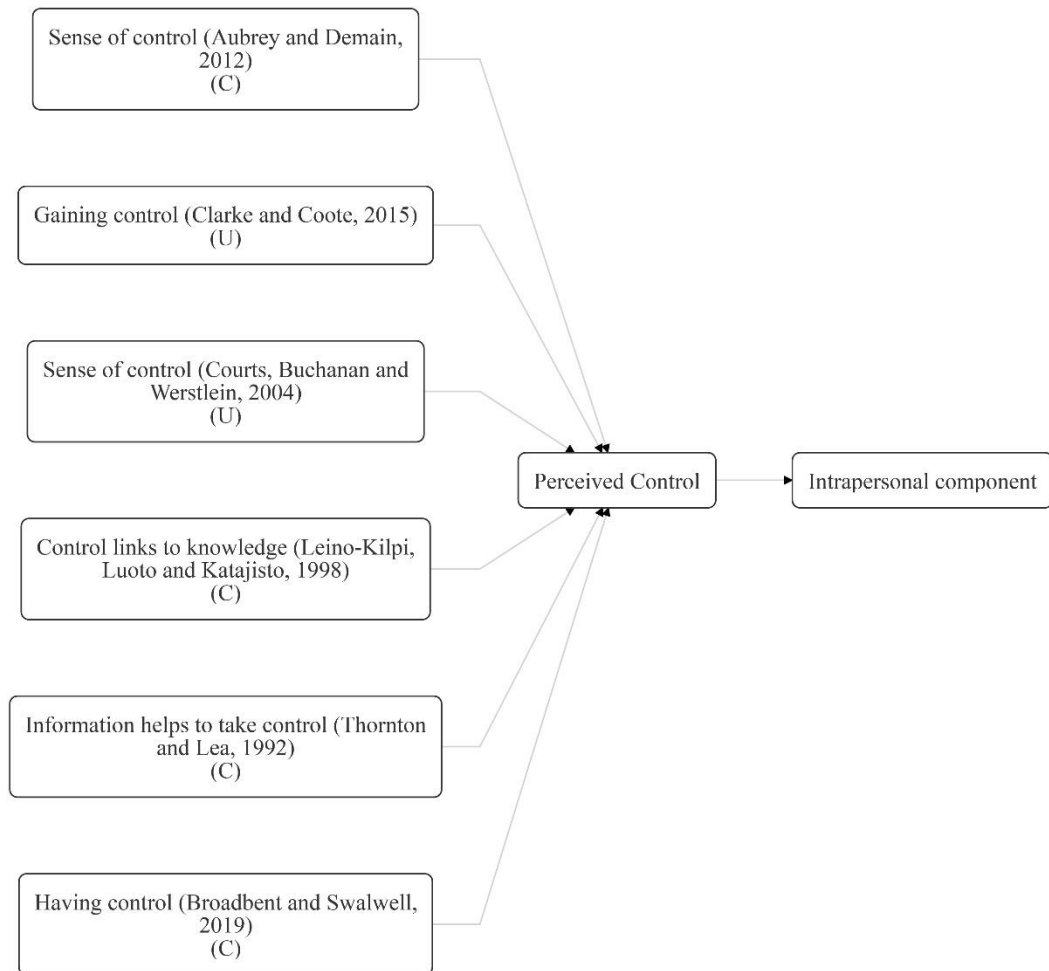


Figure 11: Meta-Aggregative Flowchart: Perceived Control as an Intrapersonal Component of Empowerment

Improved perception of competence helped research participants in this doctoral research to feel a sense of control that helped them decide about participating in a new activity. Besides in the current research sense of control was also found in two other qualitative studies involving MS patients (Aubrey and Demain, 2012; Courts, Buchanan and Werstlein, 2004). Although the group exercise programme examined in the Aubrey and Demain (2012) study is a land based exercise the authors also reported that participants developed a sense of control over their MS. The findings of a non-intervention qualitative study (Courts, Buchanan and Werstlein, 2004) also demonstrated that MS patients developed a sense of control in picking and choosing activities. Contrary to demonstrating control over choosing activities from the interventions studies, participants in the non-intervention study also reported developing a sense of control over their MS which subsequently helped them participate in new activities. This indicates that people with MS might have inherent ability to develop a sense of control. It is not clear whether the aquatic physiotherapy facilitated this ability in people with MS.

Similar to the findings of current research, participants in a community group exercise programme also reported gaining control over their MS symptoms (Clarke and Coote, 2015). Their study was completed in Ireland and included MS patients from the local community. Participants spoke about the benefit of participating in a community programme which seems to have provided them opportunities to try different activities in a safe environment. The exercise programmes offered by these studies are different, MS patients are from UK and they reported gaining control over their problems through the opportunities. Although participants in this doctoral research also talked about trying new aquatic exercises under the safe supervision of experienced physiotherapists, it is important to consider that research participants indicated interest in the continued provision of the aquatic physiotherapy service at the Burswood Centre. Because of this personal interest they might have overemphasised the benefits of the aquatic programme and expressed views that would support the continuation of this service.

In the current research, knowledge and learning about pacing strategies and better posture improved research participants' perceived control over the self-management of their MS fatigue. Similarly, acquiring knowledge and information on MS problems was reported as the strategy for gaining control over MS (Leino-Kilpi, Luoto and Katajisto, 1998; Thornton and Lea, 1992). This study was completed in Finland. Because of the differences in the culture, it might not be reasonable to relate their findings to the participants in the UK.

According to Zimmerman, psychological empowerment is a domain specific concept (Zimmerman, 1995; 2000). The current study also found associations between domains and the concept of empowerment. However, the associations between activities and empowerment observed in the current study were more explicit when compared with the associations between domains and empowerment. The following discussion will further explore the domains, activities and their associations with the concept of empowerment. Although Zimmerman emphasised the significance of the association between domain and empowerment, it was not clear why the domain attribute was only linked to a few intrapersonal qualities mentioned in the framework (see Figure 9). For example, while perceived control and self-efficacy were stated to be domain-specific, the other qualities mentioned in the Zimmerman's framework did not encompass the term "domain" (Zimmerman, 1995; 2000). Though the current study also found associations between the domains of life and the qualities of empowerment, the associations found between the activities and the qualities of empowerment are more explicit. For instance, the intrapersonal quality of perceived competence was directly related to the activity of returning to work. The association between the activity of work and quality was explicit when compared with the implicit association with the domain of material well-being. Taking into consideration the explicit associations found between the activities and the qualities of empowerment, it would be logical to propose that the empowerment found in the current study was an activity-specific concept.

The current study found numerous activity examples in the data that suggested empowerment as the carry-over benefit of aquatic physiotherapy programme for research participants with MS. The activities that illustrated the process of empowerment came from different research participants and represented different activities of their lives. The diversity of the activities found in this study suggested that the concept of individual empowerment can be better explained by the activity-specific rather than domain-specific associations. The findings suggested that the association between the domains and empowerment is not only at the superficial level of domain but also at the deeper level of activity. The associations between empowerment, domains and activities were more complex than the apparent simplistic associations described by Zimmerman (Zimmerman, 1995; 2000). It would be useful for future studies to explore whether it was essential for individuals to achieve empowerment in all the related indicators and activities associated with the domain. For example, the material well-being domain consisted of two indicators: financial and employment status. It would be useful to explore whether it is essential for an individual to gain empowerment in both the

indicators and related activities to attain overall empowerment in the material well-being domain of their life. Because of the personal preference and relative value attributed to the domains by people with MS, it would be important for therapists to understand how patients perceive the meaning of the term “empowerment” and the associated activities.

The findings of different studies demonstrated that development of perceived control could be achieved in people with MS. It is an element of empowerment and acquiring knowledge is vital in gaining control. Because of the purposive sampling and response bias in these small-scale qualitative studies, it is not possible to draw any generalisable conclusion. The effects of different interventions in facilitating a sense of control in people with MS needs further exploration and testing.

c) Motivation Control

Motivation control is a cognitive strategy aimed at strengthening the motivational basis for performing an intention. It is one of the intrapersonal components of Zimmerman’s Theoretical Framework of individual psychological empowerment. The research participants of this doctoral study also demonstrated motivation control. The benefits gained in control of their MS symptoms and the improvements achieved in their functional abilities motivated participants to take up new physical activities. During the programme, research participants learned the importance of regular physical activity and gained a better understanding of the importance of its maintenance. Although GT literature review did not find any qualitative studies linking aquatic physiotherapy with motivation control, there were two studies that reported motivation in people with MS. There were only two findings that can be linked with the motivation control of empowerment. These were ‘decreased motivation’ (Aubrey and Demain, 2012) and ‘motivators for self-management’ (Audulv, et al., 2009). Both of these findings are ‘unequivocal’ and therefore the level of credibility is considered as high. The meta-aggregative flow chart presented on the preceding page displays the link between the findings of those studies and motivation control.

A qualitative study conducted in the South East of England found decreased motivation as a factor in not continuing home exercise (Aubrey and Demain, 2012). Participants reported that group activity motivated them in participating in exercise. Although there is no similarity in the purpose of this doctoral study and Aubrey and Demain (2012) research, there are some similarities and differences in their findings. Similar to Aubrey and Demain (2012) research, the research participants in this doctoral study identified

group interaction as a motivating factor. They reported group support as a motivating factor in carrying out the self-management activities beyond the therapy environment. A possible reason for this motivation could be explained by discussing the motivational factors for self-management found in another study completed in Sweden (Audulv, et al., 2009).

Participants in Audulv, et al., (2009) study reported a health threat or an experienced need for self-management as the strong motivating factors for self-management. Similarly, research participants in this doctoral research expressed a desire to retain the benefits achieved from the aquatic physiotherapy programme through self-management. Their improved understanding of the importance of an active lifestyle also became a motivating factor.

Although motivation control helped research participants to continue participation in physical activities after cessation of the aquatic physiotherapy programme, it is important to note that this doctoral research finding may be limited by participation bias (Smith and Noble, 2014). Because of the Theoretical Sampling methods implemented in this Grounded Theory research, the initial participants' responses directed the selective sampling which subsequently resulted in the recruitment of more participants from the group exercise classes running at the Centre. The study sampling and recruitment was limited to a small group of volunteers who seem to have benefited from the programme. These participants are motivated to retain those benefits by attending the service at Burrswood and their views may not represent the perceptions of people who did not benefit from the intervention. Therefore the components of motivation control is applicable to a specific group of people with MS who gained benefits from aquatic physiotherapy.

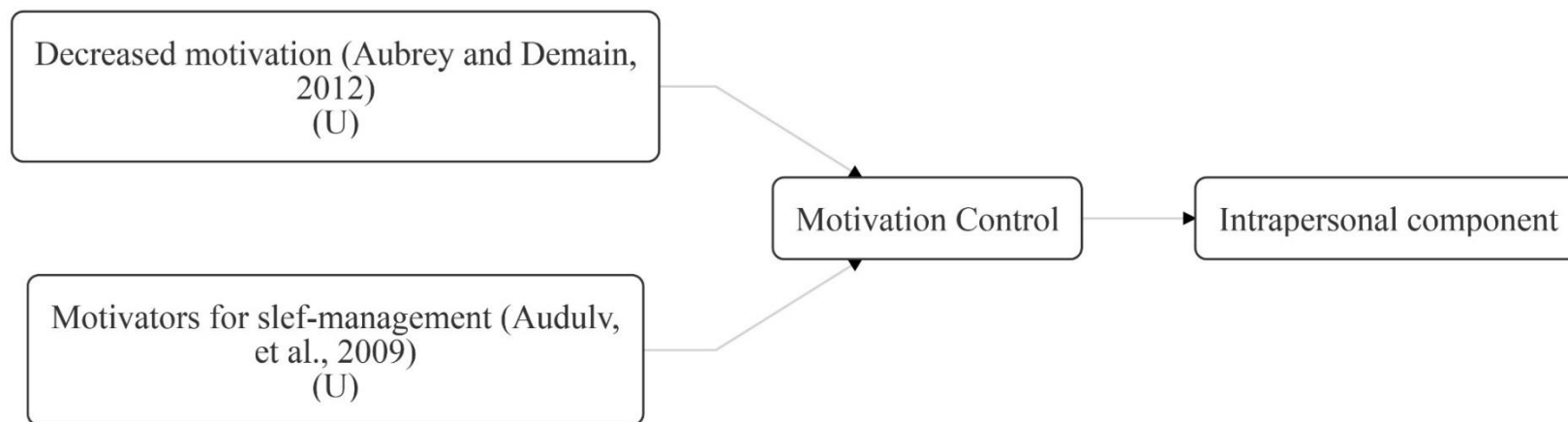


Figure 12: Meta-Aggregative flowchart: Motivational Control as an Intrapersonal Component of Empowerment

Taking into the account of available evidence, it is reasonable to consider motivation control as an intrapersonal component of empowerment. Because of the unequivocal findings extracted from the Grounded Theory literature review and the discussion of these with the findings of this doctoral research, motivational control has been added as an intrapersonal component to the Burrswood Conceptual Model of Empowerment.

d) Coping Self-efficacy

Besides the associations found between the activities and intrapersonal qualities of empowerment, this research also found that the intrapersonal qualities were influenced by participants' level of confidence in their environment and the support available to them. Although participants demonstrated motivation, competence and control of specific activities in certain environments, some of them reported a lack of confidence as a deterring factor when it came to trying those activities in different environments. The association between confidence and the familiarity of the environment was revealed from further evaluation of the self-efficacy concept. However, GT literature review did not identify any study with findings that are relevant to concept of self-efficacy and empowerment in people with MS. Therefore, a meta-aggregative flow chart could not be prepared. Because self-efficacy was mentioned as one of the intrapersonal components of Zimmerman's framework (Zimmerman, 1995; 2000) and the concepts relevant to self-efficacy were also found in the current research it was deemed appropriate for further consideration.

Maddux (2013) distinguished two forms of self-efficacy: task self-efficacy and coping self-efficacy. While the task self-efficacy represents an individual's perceived self-confidence to complete a task in an already familiar environment, the coping self-efficacy denotes an individual's perceived self-confidence to accomplish a similar task in an unfamiliar and possibly more challenging environment. For instance, after completing the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre, some research participants gained confidence in their ability to swim in the Centre's therapy pool. These participants achieved task self-efficacy because they demonstrated self-confidence in swimming in a familiar and supportive environment. Although some participants were well motivated to continue swimming and perceived themselves

competent to swimming in the Centre's therapy pool, they lacked confidence in their ability to swim in a public pool. This lack of confidence diminished these participants' feelings of perceived control, perceived competence and motivation control, and deterred them from swimming at their community leisure centre. These preceding examples illustrated a pattern of behaviour indicating that some participants achieved both task self-efficacy and coping self-efficacy as carry-over effects of aquatic physiotherapy programme; others, however, achieved only task self-efficacy. Although data excerpts supporting self-efficacy can be found in this doctoral research, it is important to note that they only represented a small group of people who seem to have benefited from the aquatic physiotherapy. There is limited understanding about the perceptions of people with MS who may not have benefited from this intervention. Further to saturate the components of empowerment and its associations with the self-efficacy of people with MS, it would have been ideal to expand the theoretical sampling and recruit people with MS who did not gain benefits.

Unlike the preceding example, participants who demonstrated empowerment were confident in performing functional activities in a wide range of challenging environments. It was reasonable to assume that to achieve empowerment in a certain activity, it was essential for a participant to be able to adapt to the fluctuating circumstances associated with that activity and thus demonstrate coping self-efficacy. For instance, to demonstrate empowerment in walking it is necessary for a person with MS to feel confident in her ability to walk in diverse and challenging environments. Taking into consideration of the differences between task self-efficacy and coping self-efficacy, it might be useful for therapists to consider both when planning therapy interventions. For example, task self-efficacy of a specific activity could be the short-term goal and the long-term goal could be the achievement of coping self-efficacy.

In view of the preceding discussion it would be appropriate to replace the intrapersonal quality of domain-specific self-efficacy of Zimmerman's framework (Zimmerman, 1995; 2000) with activity-specific coping self-efficacy.

e) Positive Attitude

There were instances in this doctoral study when research participants reported changes in their attitudes to coping with MS and developed positive attitude towards their life. From these instances multiple codes were developed that subsequently helped the

formulation of the category of *Positive Attitude*. Participants developed positive feelings as the carry-over benefit of the aquatic physiotherapy programme. The psychological and physical benefits achieved from the programme made participants change their attitude to MS. Participants' ability positively to manage their lives with MS was enhanced. The combination of developing the 'can-do' attitude and positive psychological benefits contributed to the positive changes in attitude. Although this research found positive attitude to be one of the qualities of empowerment it is important to consider the possibility of response bias. Participants knew that the researcher is a member of the Multiple Sclerosis Aqua Research Team and it is possible that their responses might have overstated the benefits.

This research found positive attitude to be one of the qualities of empowerment, however Zimmerman's theory did not make any reference to this concept (Zimmerman, 1995; 2000). Furthermore, there is very little published information that explored the association between an individual MS patient's attitude and their empowerment.

The findings of different studies identified from the Grounded Theory Literature review supported the meta-aggregate flowchart of 'Positive Attitude' (Diagram 2). The findings identified themes such as 'developing positive attitude' (Aubrey and Demain, 2012), 'adopting positive 'can do' attitude' (Aubrey and Demain, 2012), changing perceptions (Block, et al., 2010), 'changing perceptions about ability' (Broadbent and Swalwell 2019) and 'changing attitude' (Courts, Buchanan and Werstlein, 2004; Skår, et al., 2014). These were similar to the attributes of a positive attitude demonstrated by the participants in the current research. However, those studies did not identify positive attitude as a quality of empowerment and did not acknowledge this as a separate construct.

In the current study research participants who had a favourable attitude to exercise were optimistic about its benefits and were engaged in regular exercise. Conversely, participants who had unfavourable attitude to exercise were pessimistic about its benefits and were not enthusiastic in continuing participation in exercise. Participants who demonstrated positive attitude as an intrapersonal quality demonstrated positive changes in their exercising behaviour. However, it is important to note that the findings of this research were influenced by a small group of volunteers who showed benefits of the intervention. Their responses did not represent people who did not benefit. Therefore, the positive attitude could be considered as an attribute of people with MS who benefited from the aquatic physiotherapy.

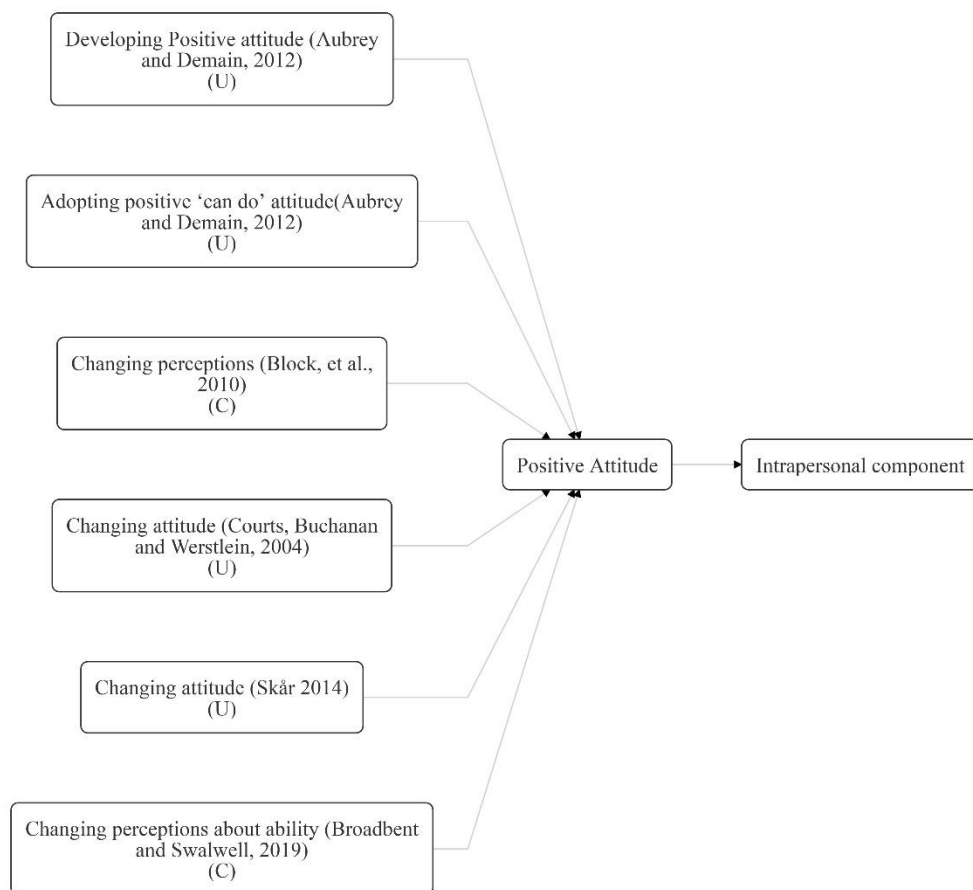


Figure 13: Meta-Aggregative flowchart: Positive Attitude as an Intrapersonal Component of Empowerment

Although it is essential for a person to develop the intention to participate in planned behaviour, developing an intention does not guarantee their participation. For instance, at the end of an exercise intervention many participants might express their intention to continue exercises at home but only a few would do so. In the current study the development of a positive attitude as an intrapersonal quality facilitated the process of empowerment in participants by not only enhancing their intention to participate in the planned behaviour but also by bringing about favourable changes in their behaviour. Empowered participants mobilised resources, created favourable circumstances and participated in the planned behaviour. It would be logical to assume that there is an association between the positive attitude and a change in the participant's behaviour.

A qualitative study completed in the South of England found positive attitude and gaining control to be among the benefits of a structured community group exercise programme (Aubrey and Demain, 2012). Although the land based group exercise intervention offered by Aubrey and Demain's (2012) study differs from the Burrswood's individualised aquatic physiotherapy programme, their findings have some similarity. Both study participants demonstrated positive attitude towards exercising and reported exercise as a form of 'taking action' by which they could exert control over the progression of their MS.

Positive evolution in beliefs and attitude was found in a study by Block et al (2009). This is a mixed-methods study that explored the self-efficacy of MS patients after completing a Project Shake-it-UP programme. This programme consisted of 10 full day sessions with educational, recreational and physical activities at local community centres in the Northern States of the USA. Although the intervention offered by Block et al (2009) differs from this doctoral research in that it was a land based exercise programme, it also contributed to a change in the participants' perceptions of their abilities and developed positive attitude towards their abilities. Changing perceptions of ability was also found in the sailing intervention study called 'Oceans of Hope' journey (Broadbent and Swalwell 2019). 94 patients with MS from 16 countries participated in a 17 month sailing activity. The study explored the psychological benefits of this journey by using online blogs. Although the intervention is in no way similar to the aquatic physiotherapy offered in the current research, participants in the 'Oceans of Hope' study changed their perceptions of their ability to cope with MS, which contributed to their empowerment. The findings of their study suggest that the changing perceptions is a component associated with the process of empowerment.

Positive change in attitude was also observed in the quotes from non-intervention study that looked at the lived experience of people with MS (Courts, Buchanan and Werstlein 2004). Some participants reported control over their MS and demonstrated this by changing their attitude towards MS. Participant quotes such as '*I am not going to let this stop me*' and '*I have MS, MS doesn't have me*' were presented in the article. These quotes represented positive change in the attitude and control over their MS. This study did not offer any intervention, which is dissimilar to that of aquatic physiotherapy offered in the current research. Some of their patients reported positive changes in their belief and attitudes even without an intervention. This indicates that people might have inherent ability to make changes in their attitude without any intervention. However, it is not clear whether this only applies to people with inherent traits.

Though there are very few instances of use of the terms "attitude" and "empowerment" together in the literature, only one publication has presented 'positive attitude' as one of the qualities of individual empowerment. A phenomenological study conducted in Norway (Skår, et al., 2014) did not categorise 'change in attitude' as a separate theme. The participant quotes cited in the Skår, et al. (2014) article suggested positive changes in patients' attitude to their MS and mobility aids. These quotes exemplified the importance of positive change in the attitude to personal empowerment.

In view of the preceding discussion and findings of this doctoral research, there is evidence to link 'positive attitude' with the concept of empowerment. Therefore, to adapt Zimmerman's framework to the Burrswood Health and Wellbeing Centre's aquatic physiotherapy programme, 'positive attitude' is added to the intrapersonal qualities of empowerment.

f) Realising Potential

In the current study *realising potential* was developed as an intrapersonal quality of empowered participants. Comparison of the findings of this research with the Zimmerman's theory (Zimmerman, 1995; 2000), showed that *realising potential* was not specified as an intrapersonal quality in Zimmerman's Theoretical Framework of Individual Psychological Empowerment (Zimmerman, 1995, p.588). Before adding this to the framework it will be discussed with the relevant findings identified in the Grounded Theory literature review.

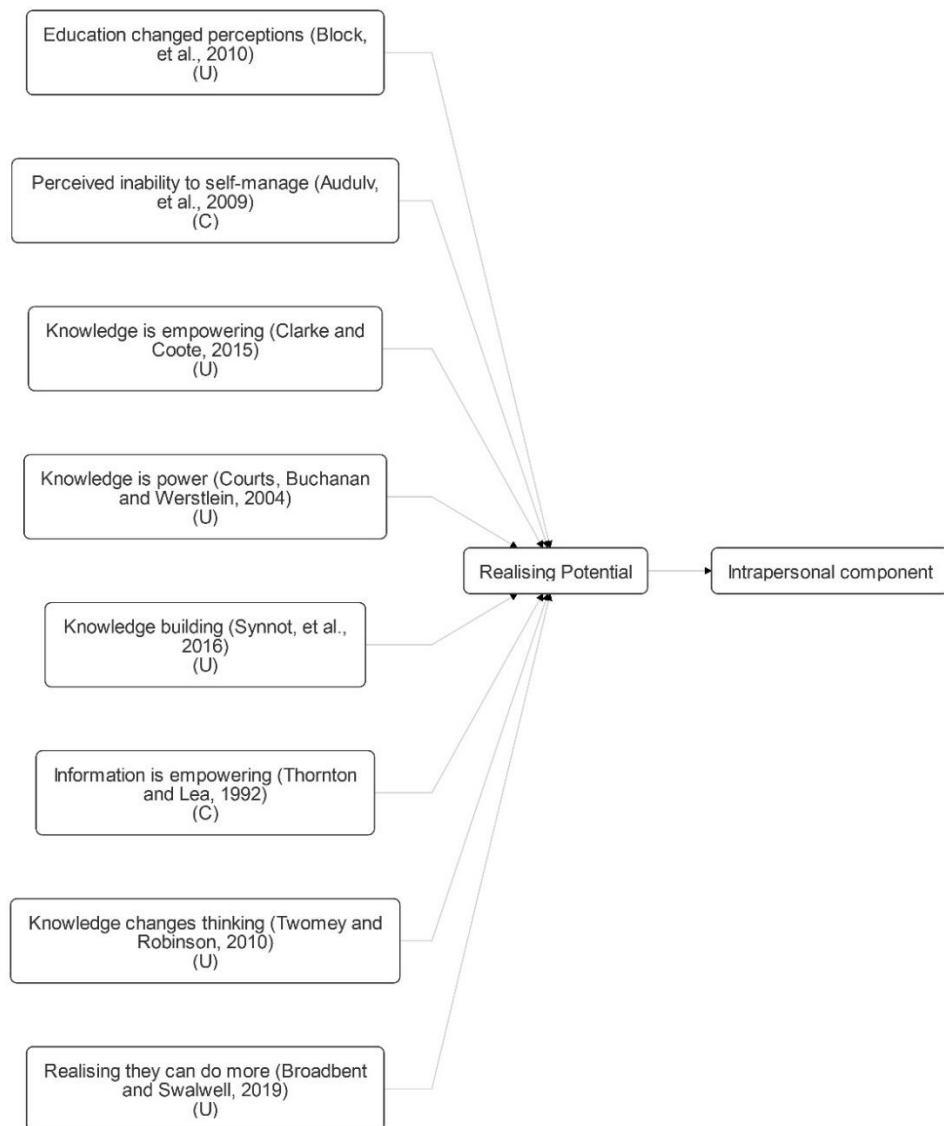


Figure 14: Meta-Aggregative flowchart: Realising Potential as an Intrapersonal Component of Empowerment

The findings of different studies identified from the Grounded Theory Literature review supported the meta-aggregate flowchart of 'Realising Potential' (Figure 14). The review identified 8 findings which have attributes of realising potential demonstrated by research participants in the current doctoral study. These are: 'education changed perceptions' (Block, et al., 2010), 'realising they can do more' (Broadbent and Swalwell 2019), 'knowledge is empowering' (Clarke and Coote, 2015), 'knowledge is power' (Courts, Buchanan and Werstlein, 2004), 'knowledge building' (Synnot, et al., 2016), 'knowledge is power' (Synnot, et al., 2016), 'information is empowering' (Thornton and Lea, 1992) and 'knowledge changes thinking' (Twomey and Robinson, 2010). Although 7 of these findings are unequivocal authors of those studies did not identify realising potential as a component of empowerment and did not acknowledge it as a separate construct.

Participants in a mixed methods study indicated that education received during the Project Shake-It-Up programme helped them change their perceptions of their abilities (Block, et al., 2010). Research participants of this doctoral study also spoke about physiotherapists providing personalised information to them about their MS and educating them about the activities they can try. Although the Project Shake-It-Up programme is not similar to the aquatic physiotherapy offered by the Burrswood Centre, the perspective of MS patients suggested that education has the potential to change patient's perceptions about their abilities.

Knowledge of abilities and limitations helped MS patients to acknowledge and accept their limitations and realise their ability to participate in more alternative activities (Broadbent and Swalwell 2019). Participants in a fatigue self-management programme demonstrated altered thinking about their ability to manage fatigue because of acquisition of new knowledge (Twomey and Robinson, 2010). Similar to the findings of previous research, participants' quotes in this doctoral research suggested that the knowledge gained during aquatic physiotherapy at Burrswood Health and Wellbeing Centre helped MS patients to change their thinking about their abilities and realise their own potential to participate in more activities. The acquisition of knowledge of their MS problems helped MS patients to realise their abilities and limitations. Acquisition of knowledge helped research participants in realising their own potential which subsequently contributed to the process of empowerment.

Findings of the Grounded Theory literature review suggested that there is evidence to associate acquisition of knowledge with the process of empowerment. There were quotes presented in the previous research that suggested 'knowledge is empowering', 'knowledge is power' and 'information is empowering' (Clarke and Coote, 2015; Synnot, et al., 2016; Thornton and Lea, 1992). Participants in a community group exercise programme felt empowered by gaining knowledge (Clarke and Coote, 2015). An interpretative qualitative study completed in Australia recruited 51 MS patients and conducted focus groups (Synnot, et al., 2016). This study explored the views of MS patients in integrating health information. Participants of their study reported knowledge as power. Although they gathered information from multiple sources, they were concerned about the trustworthiness of that information. Participants were keen to engage in a research partnership with health professionals so that they can check the accuracy of information. There have been concerns about misinformation, information overload, lack of personal relevance, internet seem to be one of the prominent sources of information seeking (Synnot, et al., 2016). The findings of the current research did not identify the influence of this information seeking on the research participants' education and empowerment. It seems that the aquatic physiotherapy programme at the Burrswood Centre did not utilise the advantages of internet and social media for patient education and empowerment. Although research participants in the current doctoral study did not identify 'partnership' with health professionals as an element, the findings of the current study suggested that physiotherapists provided education to participants.

The category on *realising potential* in the current research was developed from the analysis of the multiple excerpts of data from the participants. The term '*realise*' was mentioned by the research participants. Some of the in-vivo codes exemplifying the term 'realising' found in this research were: *realising weakness*, *realising physical abilities*, *realising reasons*, *realising limitations*, *realising the need for physical activity*, *realising the need for pushing*, *realising the ability to work*. In the current doctoral research multiple codes from several participants demonstrated a pattern in the data that supported the use of the term '*realising*' which generated the name of the category as *Realising Potential*. Since this quality was not mentioned in the Zimmerman's framework (Zimmerman, 1995, p.588), it would be reasonable to argue for the addition of *Realising Potential* to the intrapersonal qualities of empowerment.

But before adding realising potential to Burrswood Conceptual Model of Empowerment, it is important to evaluate this category with the Bandura's Self-efficacy because there appears to be some similarities between these two concepts. Self-efficacy means one's

belief in their own ability to complete a given task (Bandura, 1997). According to this, an individual's ability to complete an action is associated with their belief to organise and execute the necessary tasks. *Realising Potential* in the current research is described as "a participant's realisation about their capacity to participate in a future activity". The similarities between the description of self-efficacy and *Realising Potential* can be found in the ability versus capacity and given attainment versus future activity. However, the main difference in these concepts can be found in the use of the terms "realisation" and "belief" which were used to describe the psychological process associated with these concepts. The term "belief" used in Bandura's model refers to an individual's feeling of self-confidence to complete an action. Alternatively, "realisation" described in the current study refers to participants' becoming fully aware of their abilities, strengths, weaknesses and overall capacity to participate in a future activity or behaviour. The psychological process of realisation is a strong construct because it originated from learning, better understanding and practical awareness of one's own capabilities and limitations. In contrast, psychological process of 'belief' mentioned in the self-efficacy model was not a strong construct because it meant individual's assumptions about one's ability that were not necessarily substantiated. Intrapersonal components presented in Zimmerman's framework were focused on the internal beliefs about one's own ability (Zimmerman, 1995, p.588). In addition to these internal beliefs, the current research also found intrapersonal qualities that were focused on a person's self-awareness of their capacity. In view of the differences between *Realising Potential* and self-efficacy, the former was added to the Zimmerman's framework as one of the intrapersonal components so that the adapted model will be suitable for the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre.

10.2.2 Interactional Components

The interactional components in Zimmerman's framework (Zimmerman, 1995, p588) refers to individual's skills and understanding about the resources in their community. According to Zimmerman, to achieve empowerment, it is important for the individual to develop necessary skills to perform activities, develop critical awareness and understanding the causal agents so that they can mobilise the resources as required (Zimmerman, 1995; 2000). In common with Zimmerman's theory, the current study also found examples that demonstrated interactional components. For example, participants developed the necessary skills that enabled them to participate in various activities. Zimmerman's theory mainly focused on the psychological aspects of skills (Zimmerman,

1995; 2000). Because of the focus and context of this research, the achievements gained in the physical abilities of the participants and their ability to interact with the environments that were meaningful to them have been considered to be among the interactional components.

The second Synthesised Finding of the Grounded Theory literature review also identified interactional components of empowerment of people with Multiple Sclerosis. Empowerment process of people with MS can be facilitated by the interactions with peers and professionals and enablement. Although the level of evidence supporting this synthesised finding is weak (Grade B), this finding suggested that the process of empowerment in people with Multiple Sclerosis can be facilitated by interactions and enablement. The synthesised finding of interactional components was developed from the categories of 'interactions with peers and professionals' and 'enablement'. These categories were developed from 11 findings (9 Unequivocal + 2 Credible) of the Grounded Theory literature review. These findings were extracted from 6 studies (Aubrey and Demain, 2012; Clarke and Coote, 2015; Leino-Kilpi, Luoto and Katajisto, 1998; Skår, et al., 2014; Synnot, et al., 2016; Twomey and Robinson, 2010).

There are some similarities and differences in the interactional components of the Zimmerman's Theoretical Framework of Individual Psychological Empowerment, Burrowswood Conceptual Framework of Empowerment and the categories found in the Grounded Theory literature review. Table 18 presents a comparison between these three. The following discussion provides further explanation of those similarities and differences.

Although the categories developed in the Grounded Theory literature review have some similarity to the interactional components of skills development, skills transfer across the domains and resource mobilisation mentioned in the Zimmerman's framework the review did not find any categories supporting the critical awareness component. Both the Grounded Theory literature review and findings of the current research identified 'interactions with peers and professionals' as a category of empowerment. However, this was not mentioned in the Zimmerman's framework.

The interactional components found in the current study are grouped under three main components and presented in the Burrowswood Conceptual Framework of Empowerment: Interactions with peers and therapists, enablement and critical awareness. While 'skills development' and 'skills transfer across the domains' components of the Zimmerman's

framework are incorporated into enablement, understanding causal agents component is incorporated into critical awareness component of the Burswood framework. Table 18 provides a comparison between Zimmerman's theoretical and Burrswood conceptual framework further explanation of incorporation of different components.

The following subsections will use Zimmerman's framework within which to present a discussion that integrates, evaluates and compares the categories of 'interactions with peers and professionals', 'enablement' and 'critical awareness' with the findings of the current doctoral study and the Grounded Theory literature review.

Interactional Components			
Burrowswood Conceptual Framework	Grounded Theory Literature Review	Zimmerman Theoretical Framework	Comments
Interactions with peers and physiotherapists	Interactions with peers and professionals		<ul style="list-style-type: none"> • There is no difference in the meaning related to interactional components of Burrowswood's framework and Grounded Theory literature review. • Interactions were not mentioned in the Zimmerman's framework.
Critical awareness		Critical awareness	<ul style="list-style-type: none"> • There is no difference in the meaning related to critical awareness of Burrowswood's and Zimmerman's framework. • Critical awareness category was not found in the Grounded Theory literature review.
		Understanding causal agents	<ul style="list-style-type: none"> • 'Understanding causal agents' category was not found in the Grounded Theory literature review. • Although there is no difference in the meaning related to 'understanding causal agents', this component of Zimmerman's framework is incorporated into the 'Critical awareness' component of the Burrowswood's framework.
Enablement	Enablement	Skills development, skills transfer across the domains and resource mobilisation	<ul style="list-style-type: none"> • Enablement was not mentioned in the Zimmerman's framework. Although there is no difference in the meaning related to 'skills development', 'skills transfer across the domains' and 'resource mobilisation', these components of Zimmerman's framework are incorporated into the 'enablement' component of the Burrowswood Conceptual framework. • Enablement was identified as a category in the Grounded Theory literature review. There is no difference in the meaning related to enablement component of Burrowswood Conceptual framework and Grounded Theory literature review.

Table 18: Comparison of Interactional Components of Empowerment in Grounded Theory literature review, Burrowswood and Zimmerman's frameworks.

a) Interaction with peers and professionals

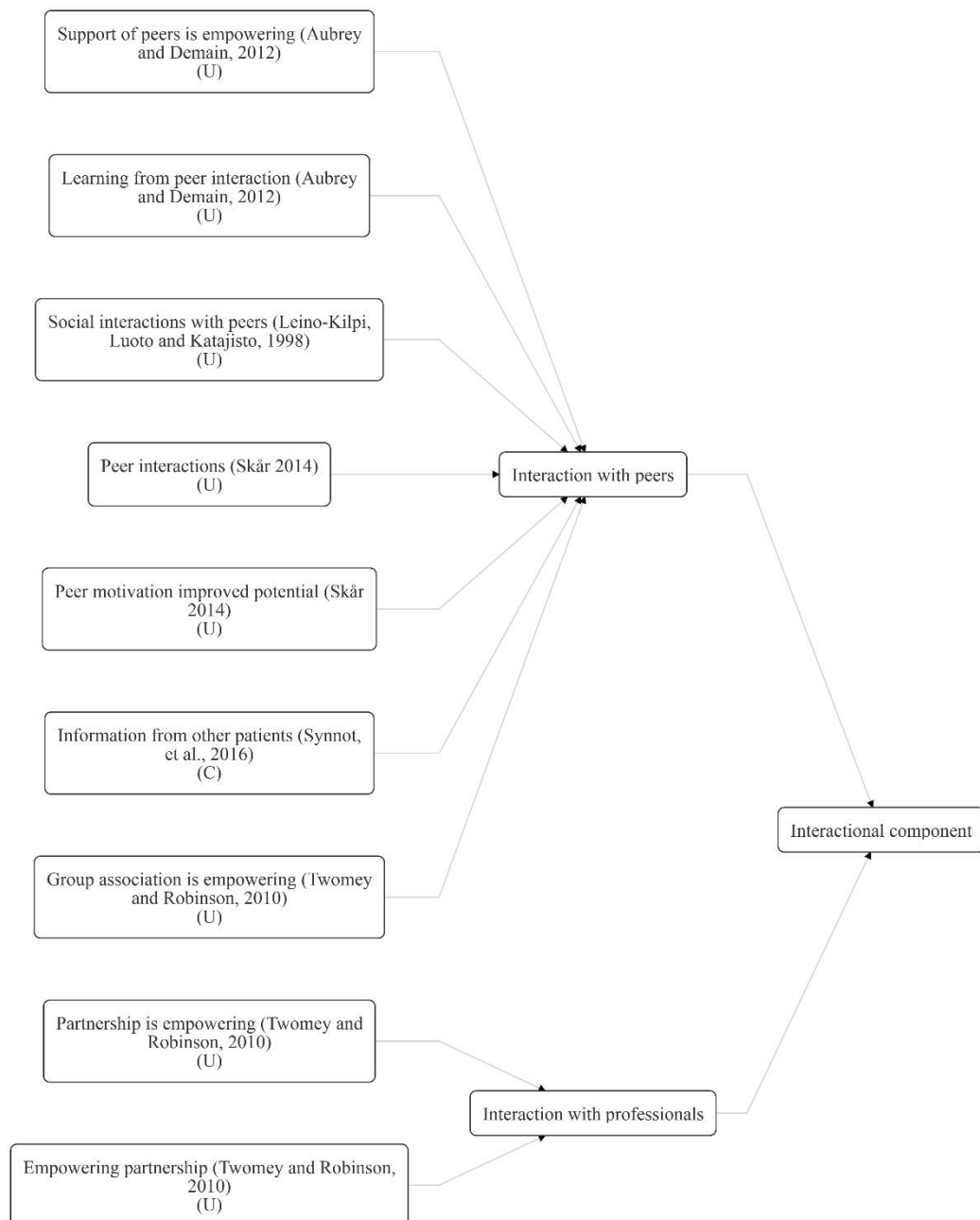


Figure 15: Meta-Aggregative Flowchart: Interactions with Peers and Professionals as Interactional Components of Empowerment

The current study found that participants benefited from interaction with therapists and other MS patients who attended the aquatic physiotherapy programme. The findings indicated that the interactions were resourceful, improved participants' knowledge and contributed to their empowerment. Similar to the findings of this research, there is evidence to support the notion that interactions with peers and professionals are important contributors to patient empowerment. There were multiple findings extracted from the Grounded Theory literature review that supports the benefits of interactions with peers. However, there was very little evidence to support the association between empowerment and patients interactions with professionals.

The Grounded Theory literature review extracted two unequivocal findings. These are: empowering partnership and partnership is empowering (Twomey and Robinson, 2010). Both of these findings were extracted from a pilot study completed in Ireland (Twomey and Robinson, 2010). This study explored the effects of a community fatigue-management programme for MS patients. It found patient empowerment as a result of mutual collaboration and partnership between therapist and patient (Twomey and Robinson, 2010). Research participants of the doctoral study reported interactions with aquatic physiotherapist helped them to improve their knowledge and understanding. Participants knew that the researcher is a physiotherapist and a member of the Multiple Sclerosis Aqua Research Team. Researcher's presence might have biased the responses (Creswell and Creswell, 2018). Participants might have provided responses that are desirable instead of presenting their true opinions (Van de Mortel, 2008). Therefore it is possible that their responses have overstated the benefits of interactions with physiotherapists.

Although partnership was identified in the Grounded Theory literature, the findings from current doctoral study can be related to the concepts of partnership or mutual collaboration. As there is evidence to support the association between interactions with professionals and empowerment, further exploration will be necessary to understand whether the interactions found in this doctoral study were similar to the mutual collaboration and partnership identified in the literature. The primary focus of the current study was to explore the experience of participants: hence there was only the opportunity to find the dimensions of empowerment as depicted in their views. To gain a comprehensive understanding of the concept of empowerment it will be important that future studies explore the role of interaction of physiotherapist and participant.

Besides the benefit of interaction with therapists, there is also evidence to suggest that persons with MS benefit from interaction with peers with similar condition. Research participants in this doctoral study also reported benefits of social interaction with peers. Because of the purposive sampling methods and subsequent theoretical sampling methods implemented in this doctoral study, the majority of the volunteers came from a group exercise programme. Participants knew each other very well and valued the social benefits of each other. This limitation in the sampling method might have contributed to the over portrayal of benefits of social interactions and their association with empowerment. Though these benefits were discussed in the light of carry-over effects of aquatic physiotherapy programme, because of the social connection between the participants the benefits of aquatic intervention should be considered with caution.

The Grounded Theory literature review extracted 7 findings that supported the association between concept of empowerment and interactions with peers. These are: support of peers is empowering (Aubrey and Demain, 2012), learning from peer interaction (Aubrey and Demain, 2012), social interactions with peers (Leino-Kilpi, Luoto and Katajisto, 1998), peer interactions (Skår, et al., 2014), peer motivation improved potential (Skår, et al., 2014), information from other patients (Synnot, et al., 2016) and group association is empowering (Twomey and Robinson, 2010). 6 out of 7 findings are unequivocal. Therefore, it is reasonable to consider them for further discussion and integration into the Burrswood Conceptual Framework.

A qualitative phenomenological study completed in Norway found that interaction of MS patients during an inpatient rehabilitation programme contributed to patient empowerment (Skår, et al., 2014). Two studies that conducted research on the community based group programmes reported empowerment from social support of peers and group association (Aubrey and Demain, 2012; Twomey and Robinson, 2010). Both of these studies were completed in the UK. A survey gathered data from 64 MS participants found social interactions are the most important elements of empowerment for MS patients (Leino-Kilpi, Luoto and Katajisto, 1998). Out of the 11 studies, this is the only study that reported cultural context of their participants. Because their study was completed in Finnish cultural setting and the findings identified the importance of social aspects, it's applicability to MS patients in other cultures could be limited.

Interactions with peers contributed to learning from peers and gaining useful information from other patients (Aubrey and Demain, 2012; Synnot, et al., 2016). Aubrey and Demain, (2012) was completed in Ireland and has already been discussed in the preceding paragraph. Synnot, et al's (2016) study conducted focus groups and online forums for exploring the information searching behaviour of MS patients and their families. Although authors did not specify the cultural context of their study it was completed in Australia. Findings of their study indicated patients benefited from interactions with other patients who have similar problems. Similarly, research participants of this doctoral study also indicated learning from peers and benefits of sharing information about MS problems with other MS patients. Although these studies did not specifically link learning to empowerment, they identified interactions with peers as facilitator for the process of empowerment.

The findings extracted from the Grounded Theory literature review supported the interactions as a component of empowerment. The findings of this doctoral research also supported the interactions as a component of empowerment. Therefore, it is reasonable to support the notion that interactions with peers and professionals can be contributors to empowerment of people with MS. However, interactions with peers and professionals were not mentioned in the Zimmerman's framework (Zimmerman, 1995, p588), therefore these were added to the interactional components of the Burrswood Conceptual Framework of Empowerment.

b) Enablement

There are close similarities between the processes of empowerment and enablement. The etymological description of the term 'empowerment' also suggests 'to enable' (Green and Raeburn, 1988). Both concepts are associated with development of new knowledge and skills and better use of resources. A concept map of patient empowerment developed by Fumagalli, et al. (2015) also identified enablement as a component of patient empowerment. The process of enabling patients has been reported as providing necessary knowledge, skills and ability for patients (Fumagalli, et al., 2015). Another concept analysis based on a literature review also found the enabling process to be an important aspect of patient empowerment (Castro, et al., 2016). The concept of enablement found in the current study is consistent with the previous evidence.

In the current research the findings suggested that empowerment was brought about by enablement. The aquatic physiotherapy programme helped research participants to gain better knowledge and understanding of their physical abilities. Participants developed skills, explored new resources and used appropriate resources that enhanced their ability to participate in more day-to-day activities. According to Knutsen and Foss (2011), empowerment is *“a supportive process in which individuals or groups are enabled to change their situation for the better”*. Similarly, the empowerment process observed in the current study was supportive, enabling participants to make changes and improve their lives. The findings of the current study echoed the view of Rodwell (1996): *“empowered people are enabled to choose, to take control over, make decisions about, their lives”*. The empowerment achieved from the aquatic physiotherapy programme also enabled participants to take control of their lives with MS.

The Grounded Theory literature review extracted only 2 findings that are relevant to the concept of enablement. These are 'increased ability' (Clarke and Coote, 2015), 'benefits transferring to life domains' (Clarke and Coote, 2015). Both of these findings were extracted from a qualitative study completed in Ireland (Clarke and Coote, 2015). The level of available evidence on the enablement concept is considerably low. The meta-aggregative flow chart (Figure 16) in the next page displays these findings.

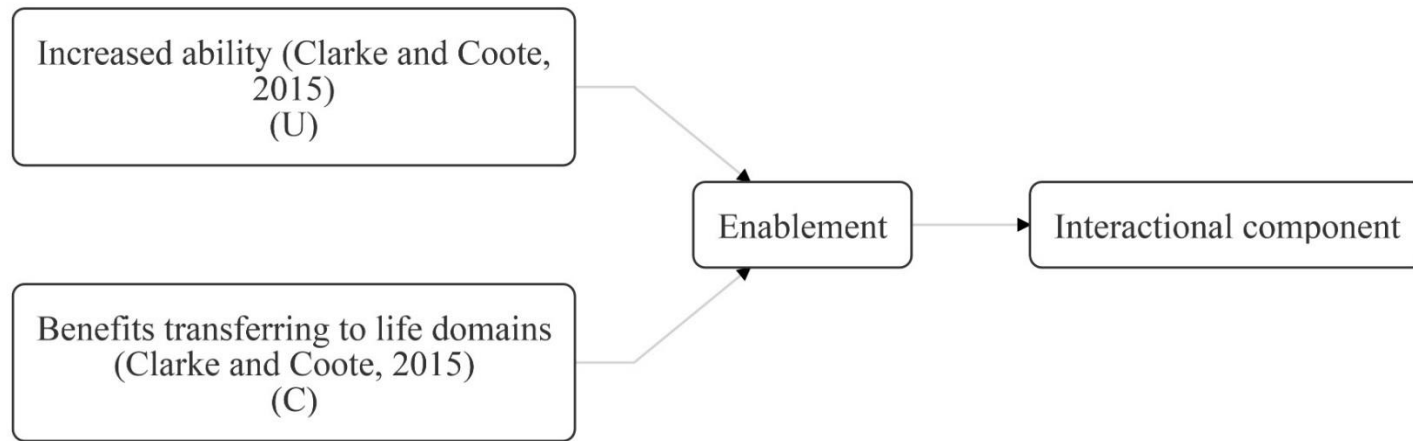


Figure 16: Meta-Aggregative Flowchart: Enablement as an Interactional Component of Empowerment

Clarke and Coote's (2015) study explored the perceptions of MS patients who completed a community group exercise programme. Participants of their study spoke about physical benefits of participating in a group exercise programme. Participants indicated improvements in their fatigue improved their feelings of energy which led to improved participation in activities of daily living. Although authors linked the psychological benefits with empowerment, they did not associate the physical benefits to the achievement of overall empowerment. The physical benefits such as improved fatigue and strength contributed to improvements in patient's ability of participates wide range of activities. Although the community group exercise interventions of Clarke and Coote's (2015) differs from individual aquatic physiotherapy offered by Burrswood Centre there were similarities in the enablement aspect of empowerment.

After completing the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre majority of research participants reported improvements in their physical abilities such as strength, balance and mobility. These improvements enabled research participants to perform many activities and participate in skills which were pertinent to their lives. After the aquatic physiotherapy programme, the skills of the research participants improved. There were incidents in the data that suggested that the participants felt confident in their abilities and tried challenging activities in new environments that were not similar to the activities they practised in the therapy settings. For instance, a research participant went on a day trip to London with her school-aged grandchildren, Lara returned to work, Karina took over childcare responsibilities. These examples suggested that some of the research participants developed skills and transferred the skills learned in the therapy setting to other settings pertinent to their lives. Thus, aquatic physiotherapy programme enabled participants to gain skills and transfer those to new environments. It is important to remember that the benefits reported were from a small group of research participants. Because of the limitations of sampling technique and participation bias these findings does not represent the views of people who did not benefit from the intervention.

The findings of Clarke and Coote's (2015) study also reported benefits achieved from their programme transferred to the life domains of MS patients. Although the community based group exercise programme offered by Clarke and Coote, (2015) study is different to the aquatic physiotherapy offered in the current research, participants' quotes suggests the possibility of skills transfer across domains.

Clarke and Coote's (2015) study used focus groups to collect data and there is potential for social desirability bias. Participants' responses in a focus group can be driven towards usual expectations and socially desirable answers (Acocella, 2012). Because of the nature of focus group setting it is possible for participants of Clarke and Coote's (2015) study altered their responses and made them socially desirable to other members of focus group (Grimm, 2010). This could limit the credibility of the benefits identified in Clarke and Coote's (2015) study. Unlike Clarke and Coote's (2015) study, the current doctoral research conducted individual interviews. However, the doctoral research also might be limited by the response bias. Researcher's presence might have biased the responses because research participants knew that researcher is a physiotherapist and associated with the Multiple Sclerosis Aqua Research team.

Active participation is considered as the product of empowerment process and the physical benefits contributed to skills development and skills transfer across domains. Physical benefits enabled people with MS to achieve participation (Clarke and Coote, 2015). Enablement process also found in the current doctoral research. Therefore, the interactional components of 'skills development' and 'skills transfer across the domains' of the Zimmerman's framework (Zimmerman, 1995, p.588) were replaced, in the Burrowswood Conceptual framework of Empowerment, by the concept of enablement.

Enablement of patients is considered as one of the core competency skills of Occupational Therapists. They use 'capabilities approach' to improve strengths, resources and skills of patients. These improvements are intended to help patients to actively engage in self-management, make purposive choices for achieving their desired goals (Hammell, 2016). Empowerment and enablement are commonly associated with the professional literature pertaining to Occupational Therapists. However, the research participants of the current study did not indicate the role of Occupational Therapists' in their enablement. Participants' quotes did not suggest any collaboration between physiotherapists and occupational therapists in the enablement process. Because of their expertise in life domains, occupational therapists are in a better position to facilitate transfer of skills to multiple domains of patients' life. It would be useful for future research to explore the additional advantage of combined aquatic physiotherapy and occupational therapy intervention on the enablement and empowerment of MS patients.

c) Critical Awareness

Awareness in the context of patient empowerment is described as gathering information about health, gaining knowledge that is purposeful and developing understanding of issues pertaining to one's own health (Kaladoudi and Makris, 2015). Empowered individuals become self-sufficient and resourceful in identifying the problems of health, analysing the reasons, exploring solutions, arranging resources, and implementing strategies to resolve those problems independently (Rodwell, 1996).

Grounded Theory literature review identified only one finding relevant to the concept of critical awareness, hence a category or meta-aggregative flow chart could not be developed for the critical awareness component of empowerment. 'Awareness of ability and resources' was extracted as a finding from a qualitative study completed in Norway (Skår, et al., 2014). Their study explored the experiences of people with MS participating in an in-patient rehabilitation. Participants spoke about the benefits of in-patient rehabilitation and indicated that it helped them to focus on their ability and resources. Although the finding supports that their participants developed awareness of their abilities and resources it is not clear whether this is similar to critical awareness mentioned in the Zimmerman's Framework.

Critical awareness goes beyond the basic level of awareness; it refers to a patient developing the ability to critically appraise available resources, their own strengths, weaknesses, opportunities and to problem solve issues associated with their health. Empowerment appears to be associated with the process of enablement of individuals so that they develop critical awareness of problems and available resources. Therefore, it is not clear whether the awareness of abilities and resources gained in the Skår, et al. (2014) study is similar to the critical awareness. The study setting and intervention offered by Skår, et al., (2014) research is different to the current doctoral research. For example, aquatic physiotherapy offered in this doctoral study was delivered in an outpatient setting which is different to the inpatient land based intervention offered by Skår, et al., (2014) study. For this reason, it is not sensible to compare these studies.

The empowered research participants in the current doctoral study developed critical awareness of their environment and the socio-political context. Research participants optimised the use of the available resources and mobilised the resources that were necessary to achieving their goals. For instance, when research participants decided to

continue participation in regular exercise after completing the aquatic physiotherapy programme, some explored the fitness facilities available near their home and some arranged to participate in group exercise classes.

Research participants of this doctoral study developed critical awareness of the factors that influenced their continued participation. They identified and evaluated the impact of deterring factors on their participation. For example, some of the community resource limitations identified by the research participants concerned transport, distance, lack of suitable facilities, cost, affordability, and binding contracts. Research participants in the current study did not mention fear of adverse effects as a potential barrier to continued participation in aquatic exercise. It is possible that the learning and understanding achieved from interaction with therapist and peers during the aquatic physiotherapy programme at the Burswood Centre may have helped these research participants to overcome the fear of the adverse effects of aquatic exercise.

No study in the Grounded Theory literature review has explored the effects of empowerment upon individuals in overcoming barriers. In the current study empowered research participants used the resources available in the community. Some research participants conquered the barriers by mobilising the resources so that they were able to lead a physically active life. Some of the examples that demonstrated the interactional qualities of empowerment included research participants' overcoming the barriers presented by inadequate transport. Research participants explored alternative transport opportunities such as seeking help from their family and friends, and arranging the transport offered by the MS Society and developing a transport buddy system. Further examples that demonstrated mobilisation of resources and overcoming barriers included some research participants' going back to their consultant neurologist and asking for additional referrals so that they were able to use the service at the Burrswood Health and Wellbeing Centre at discounted cost. Some requested financial assistance from family members to support the costs of private sessions and a few invested in their own gym at home. Thus, research participants in the current study demonstrated critical awareness by identifying, acknowledging and managing the resources. However, these findings only represented the views of a small group of research participants who found the aquatic physiotherapy beneficial. It is not clear whether the participants who did not benefit from the intervention found any facilitating and deterring factors. Further research is necessary to understand the adverse effects from the perspectives of people with MS who did not benefit from the aquatic physiotherapy.

Although the findings of the current research supports the inclusion of critical awareness as one of the interactional components of empowerment, overall the evidence supporting its association with the concept of empowerment is limited.

10.2.3 Behavioural Components

The current study found associations between changes in the behaviour of research participants and the process of empowerment. The behavioural changes observed in the current study are mostly similar to the behavioural components mentioned in Zimmerman's Theoretical Framework of Individual Psychological Empowerment (Zimmerman, 1995, p.588). Zimmerman's behavioural components represented activities such as organisational participation, community involvement and coping behaviour.

The third synthesised finding of the Grounded Theory literature review also identified behavioural components of empowerment of people with Multiple Sclerosis (see Chapter 9, section 9.10). Synthesised Finding 3 of 'Behavioural components' suggested that empowerment in people with MS can be represented by the behaviours such as active coping, and participation. Although the level of evidence supporting this synthesised finding is weak (Grade B), this finding suggested that the process of empowerment in people with Multiple Sclerosis can be exhibited by behaviours. The synthesised finding of behavioural components was developed from the categories of 'Participation' and 'Active coping' and these categories were developed from 9 findings (6 Unequivocal + 3 Credible) of the Grounded Theory literature review. These findings were extracted from the qualitative data of 6 studies (Aubrey and Demain, 2012; Block, et al., 2010; Buchanan and Werstlein, 2004; Clarke and Coote, 2015; Skår, et al., 2014; Twomey and Robinson, 2010). The categories developed in the Grounded Theory literature review have some similarity to the behavioural components mentioned in the Zimmerman's framework and also to the findings of this doctoral research. The following discussion will use Zimmerman's framework within which to present discussion that integrates, evaluates and compares the categories of participation and active coping with the findings of the current doctoral study and the Grounded Theory literature review.

Many research participants in the current study demonstrated positive changes in their behaviour as carry-over benefit of attending the aquatic physiotherapy programme at Burrswood. Participation in a wide range of activities demonstrated changes in research participants' behaviour. The behavioural modifications played an important part in

formulating theoretical codes that helped the development of the core category of empowerment. The behavioural modifications found in the current study are divided into two forms and these will be presented under the subheadings: Participation and Active Coping.

There are some similarities and differences in the behavioural components of the Zimmerman's Theoretical Framework of Individual Psychological Empowerment, Burrswood Conceptual Framework of Empowerment and the categories found in the Grounded Theory literature review. Table 19 presents a comparison between these three. The following discussion provides further explanation of those similarities and differences.

Zimmerman's framework comprised participatory components such as organisational participation and community involvement. Although the research participants in the current study demonstrated behaviour that represented participation, this study did not find enough incidents to distinguish the activities of organisational participation and community involvement. Similarly, the Grounded Theory literature review findings also did not distinguish the organisational and community involvement. The research participants in the current study participated in activities that were not just confined to a context such as an organisation or a community. For example, the activities related to personal hobbies and family roles were not necessarily related to an organisation or a community. Although community and organisational participation were only mentioned in the Zimmerman's framework, the research participants of this doctoral study participated in social activities with their family and friends. Accordingly, all the activities that research participants undertook were grouped together as 'participation' that represented one of the behavioural components of the Burrswood Conceptual Framework of Empowerment.

Active coping identified in the Grounded Theory literature review has a similar meaning to the active coping component mentioned in the Burrswood Conceptual Framework of Empowerment. Both of these suggest people with MS actively engaging in self-management behaviours. Coping behaviour mentioned in the Zimmerman's framework does not differentiate the active coping behaviours from passive coping strategies.

Behavioural Components			
Burrswood Conceptual Framework	Grounded Theory Literature Review	Zimmerman Theoretical Framework	Comments
Participation	Participation	Community involvement	Although there is no difference in the meaning related to 'Community involvement' and 'Organisational participation', these components of Zimmerman's framework are incorporated into the 'Participation' component of the Burrswood framework. In addition to these, Participation component of Burrswood framework also considered hobbies and activities with family and friends.
		Organisational participation	
Active coping	Active coping	Coping behaviours	No difference in the meaning between Burrswood and Grounded Theory literature review. Active coping is described when research participants actively engage in self-management. Zimmerman's framework does not differentiate active versus passive coping.

Table 19: Comparison of Behavioural Components of Empowerment in Grounded Theory literature review, Burrswood and Zimmerman's frameworks.

a) Participation

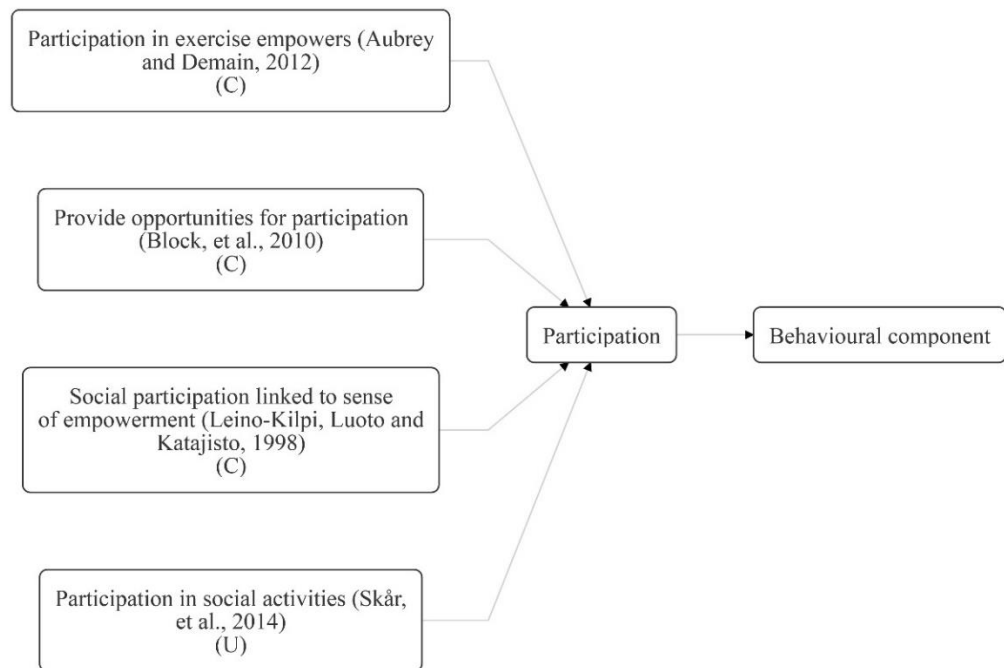


Figure 17: Meta-Aggregative Flowchart: Participation as a Behavioural component of Empowerment

The research participants in this doctoral study demonstrated empowerment by active engagement in the activities and being proactive in exploring opportunities for participation. The improvements gained in strength, balance and walking enabled research participants to become more active in their physical, functional and social lives. In addition to the benefits achieved in physical abilities, the psychological benefits such as improved confidence also empowered participation in more functional activities and perform social roles. Research participants were empowered to the extent that they became independent and participated in a wide range of activities pertinent to their lives. For instance, they accepted new responsibilities, joined support groups, started work, took up new hobbies and participated in more social activities with their family and friends. Although the preceding examples were extracted from the excerpts of the data, it is important to note that the data epitomises the views of a small group of people with MS who benefited from the aquatic physiotherapy programme.

The Grounded Theory literature review found links between participation and empowerment. The review generated four findings that supported participation as a behavioural component of empowerment. These are 'participation in exercise empowers' (Aubrey and Demain, 2012), 'provide opportunities for participation' (Block, et al., 2010), 'Social participation linked to sense of empowerment (Leino-Kilpi, Luoto and Katajisto, 1998) and 'participation in social activities' (Skår, et al., 2014). Although none of the studies found in the Grounded Theory literature review offered aquatic physiotherapy, their study participants were MS patients. The findings identified links between MS patients' feeling of empowerment and participation in activities.

A community group based exercise intervention completed in the South of England linked participation with the sense of empowerment (Aubrey and Demain, 2012). MS patients in their study indicated participation in the group exercise made them feel empowered. Authors of a mixed methods study suggested provision of opportunities to increase participation in MS patients (Block, et al. 2010). They recommended MS patients to explore activities that they may not consider are achievable. Similar to the social participation component found in the current doctoral study, participation in social activities was reported as a feeling of empowerment by two previous studies (Leino-Kilpi, Luoto and Katajisto, 1998; Skår et al. 2014). One of these studies was completed in a rehabilitation centre in Finland and the other an inpatient rehabilitation setting in Norway. Although none of these studies were completed in the UK, the findings of this doctoral research and Zimmerman's framework components suggests participation can be considered as one of the behavioural components of empowerment of people with MS.

b) Active Coping

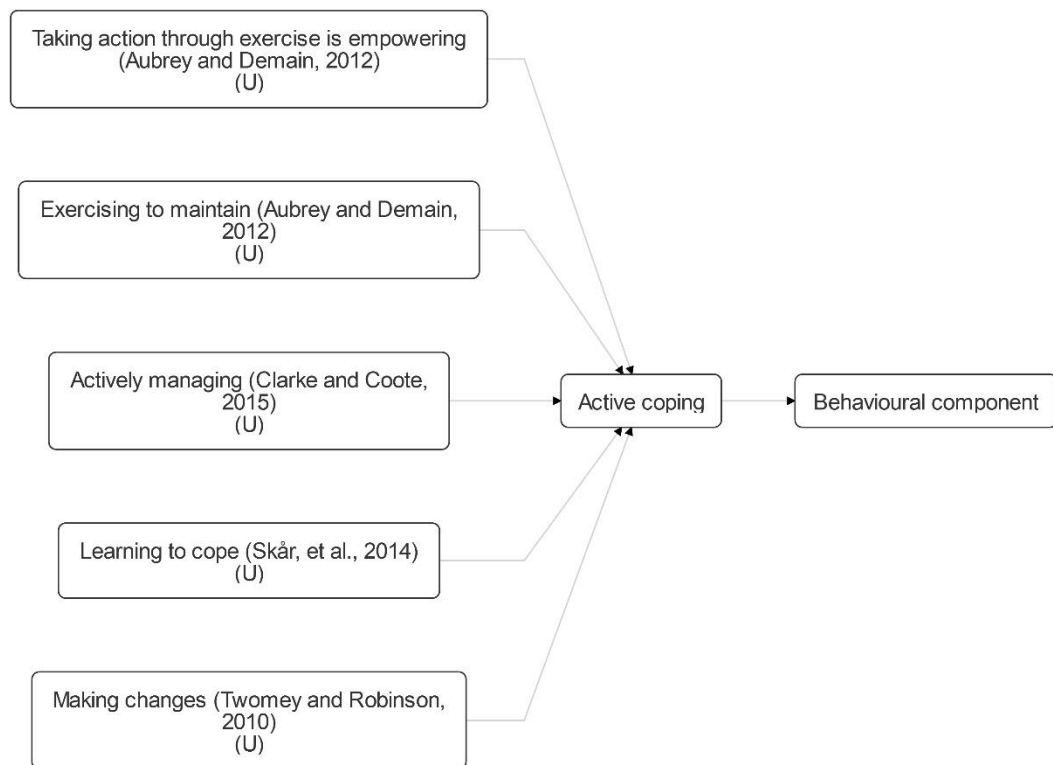


Figure 18: Meta-Aggregative Flowchart: Active Coping as a Behavioural component of Empowerment

The carry-over effects of the aquatic physiotherapy programme extended well beyond the physical and psychological benefits. Many research participants demonstrated active coping behaviour by actively engaging in self-management. Research participants became proactive in their self-management, explored and implemented better self-management strategies for managing their problems with MS. They demonstrated empowerment by showing improvements in their ability to self-manage the problems of their MS.

The Grounded Theory literature review found links between participation and empowerment. The review generated four findings that supported active coping as a behavioural component of empowerment. These are 'taking action through exercise is empowering' (Aubrey and Demain, 2012), 'exercising to maintain' (Aubrey and Demain, 2012), 'actively managing' (Clarke and Coote, 2015), 'learning to cope' (Skår, et al., 2014) and 'making changes' (Twomey and Robinson, 2010). Although none of the studies found in the Grounded Theory literature review offered aquatic physiotherapy, their study participants were MS patients. The findings identified links between MS patients' feeling of empowerment and active coping.

Research participants of this doctoral research looked at the problems caused by their MS from a different perspective and explored alternative interventions. Similarly, participants in the Skår, et al., (2014) study developed alternative ways to managing their MS by thinking differently about their MS problems. Authors used a Phenomenological approach for exploring the experience of inpatient rehabilitation of 10 people with MS. Their study was completed in Norway. Although the inpatient rehabilitation offered by Skår, et al., (2014) study is different to the aquatic physiotherapy examined in this Doctoral study, the findings suggested that participants actively engaged in coping strategies. They explored the benefits of assistive aids in managing their life. Because of their inpatient rehabilitation setting, it is possible that input from health professionals could have contributed to considering assistive aids. The current study did not find any incidences that supported the assistive aids, however there were instances that showed research participants started thinking differently and made changes.

Participants of Aubrey and Demain's (2012) study reported exercising is a form of taking action against their unpredictable problems of MS. Several of their participants also associated exercising as a form of maintaining function. They considered participation in exercise as a self-management opportunity to take action on their MS. Similarly,

research participants in this doctoral study also considered exercise as a self-management strategy and actively participated in the group exercises. Some of the research participants who could not attend the group exercise classes, explored community exercising opportunities nearer to them. However, it should be acknowledged that majority of the research participants who made changes to their physical activity behaviour in this doctoral research are people who benefited from the intervention. It is not clear whether the similar changes and active coping can be observed in the participants who did not benefit from the aquatic physiotherapy. Further research is required to explore perceptions of people with MS who did not benefit from the aquatic physiotherapy.

Participants in a community based group exercise programme completed in Ireland also demonstrated active coping by participating in the community exercise classes (Clarke and Coote, 2015). Authors reported that participants took active role in managing their MS by actively engaging in the community exercise programme. Because their study used focus group method, their findings could be influenced by social desirability bias. This means participants could provide responses that they consider as desirable by the group and this could impact the trustworthiness of their findings (Van de Mortel, 2008). In another community group exercise programme completed in Ireland also reported people with MS making changes their lifestyle (Twomey and Robinson, 2010). Although the land based group exercise intervention offered in their study is different to the aquatic physiotherapy examined in this research, both of these studies participants are people with MS. However, it is important to note that both studies only explored the experiences of a small group of people with MS who might have vested interest in continuing the provision of community exercise.

The evidence extracted from the Grounded Theory literature review came from 5 'Unequivocal' findings. The findings of this doctoral research also supported active coping. Zimmerman's framework also supported coping behaviours. Therefore it is reasonable to consider active coping as a behavioural component of empowerment of people with Multiple Sclerosis.

10.3 What is the Level of Knowledge Presented by Burrswood Conceptual Framework of Empowerment

The following discussion provides an overview of different levels of theories and explains the level of knowledge generated from this doctoral research. Depending on their generalisability, scope and level of abstraction theories are classified into four types (Higgins and Moore, 2000). These are “Meta-theory, Grand theory, Middle-range and Micro-range theory” (Higgins and Moore, 2000, p.179). Meta-theories are concerned with the philosophical enquiry of human science. Of the four levels, it provides the most abstract level of knowledge that critically examines the ontological and epistemological aspects. Grand theories provide global frameworks within which explains the universal concepts that transcend populations, services and contexts. Grand theories are also highly abstract therefore these are not helpful for developing research hypothesis that could test an empirical phenomenon.

Unlike Grand scale theories, Middle-range theories are specific enough to develop empirical research hypothesis. Middle-range theories are also generic enough to be applicable to other populations from similar contexts or similar populations from other contexts. Although Middle-range theories might not be applicable to all populations in all environments, they can be applicable to various populations from wide range of contexts. Middle-range theories are developed from repetitive testing of a theory in multiple contexts.

In the hierarchy of theoretical abstraction, Micro-range theories are at the bottom. These can be sub-classified into lower and higher level Micro-range theories (Higgins and Moore, 2000). Lower level Micro-range theory usually consists of one or few working hypothesis that is/are applicable to a specific population or particular event. Most of the quantitative studies that are intended to explore the effect of an intervention on a single variable are a good example of this type. Higher level Micro-range theories describe and explain multiple components of a phenomenon. These can be used to develop multiple propositions and generate wide range hypotheses for empirical testing. Although the characteristics of a higher level Micro-range theory are to some extent close to Middle-range theory the main differences exist in their scope, generalisability and predictability.

Although the Burrswood Conceptual Framework has been developed by integrating the findings of the current doctoral study with the Synthesised Findings of the Grounded Theory literature review and also the components of Zimmerman's framework, none of the literature identified in the GT literature review was relevant to aquatic physiotherapy. Besides the findings of this doctoral study, there is no prior research linking the aquatic physiotherapy with the concept of empowerment. Besides the findings of the current study are limited by participation bias, response bias and gender distribution bias (see Chapter 11). Therefore, the scope of Burrswood framework will be limited to people with MS attending the aquatic physiotherapy programme of the Burrswood Health and Wellbeing Centre. This framework may be applicable to a similar aquatic physiotherapy service for people with Multiple Sclerosis, but this need to evaluate by the service provider.

For the above reasons, the Burrswood Conceptual Framework of Empowerment still cannot be considered as a lower level Micro-range theory. Before it can be considered as a lower level Micro-range theory, that has the potential to be applicable to other aquatic physiotherapy services, it requires further empirical research to evaluate its applicability to large group of Multiple Sclerosis patients.

10.4 Glossary of terms

Grounded Theory methodology implemented in this research generated categories of '*realising potential*', '*positive attitude*', '*enabling*' and core category '*empowerment*'. The findings of this research were compared to the components of Zimmerman's Theoretical Framework of Individual Psychological Empowerment and the categories identified in the Grounded Theory literature review. The tables presented in this chapter provided comparison of components of empowerment in Grounded Theory literature review, Burrswood and Zimmerman's frameworks (see Table 17, Table 18 and Table 19). The following glossary of terms provide a description of terms used in this research.

Active coping: A behaviour demonstrated by actively engaging in self-management.

Coping self-efficacy: An individual's perceived self-confidence to accomplish a similar task in an unfamiliar and possibly more challenging environment.

Critical awareness: A patient developing the ability to critically appraise available resources, their own strengths, weaknesses, opportunities and to problem solve issues associated with their health.

Deterring factor: A barrier that discouraged people with Multiple Sclerosis to participate in exercise and maintain a physically active lifestyle.

Empowering: The process through which people with Multiple Sclerosis gained a better control over their lives.

Enabling: An improvement achieved, following the aquatic physiotherapy programme, in the ability of research participants to participate in the relevant physical activities.

Facilitating factor: An enabler that encouraged people with Multiple Sclerosis to participate in exercise and maintain a physically active lifestyle.

Motivational control: A cognitive strategy aimed at strengthening the motivational basis for performing an intention.

Participation: Engagement in the activities and being proactive in exploring opportunities for participation, not limiting to organisation or community.

Perceived competence: A person's own beliefs or predictions concerning their abilities and performance.

Perceived control: The belief that one can determine one's own internal states and behaviour, influence one's environment, and/or bring about desired outcomes.

Positive attitude: The carry-over benefit of the aquatic physiotherapy programme that resulted in positive change in the attitude of research participants.

Realising potential: A person's realisation about their capacity to participate in a future activity. Individual becoming fully aware of their abilities, strengths, weaknesses and overall capacity to participate in a future activity or behaviour.

Self-efficacy: refers to an individual's belief in his or her capacity to execute behaviours necessary to produce specific performance attainments (Bandura, 1977, 1986, 1997).

Task self-efficacy: An individual's perceived self-confidence to complete a task in an already familiar environment.

10.5 Summary of Discussion

In this chapter the concept of empowerment has been discussed as the chief carry-over effect of aquatic physiotherapy for research participants with MS. The chapter presented the association between the concept of empowerment and self-management of problems of MS. The discussion indicated that the concept of empowerment is an essential component in better self-management. The discussion evaluated the influence

of different contexts and personal attributes on the process of empowerment. The discussion suggested that empowerment found in the current study was a value-based construct because different research participants attributed different value to different activities in their lives.

The discussion chapter compared and contrasted the components of empowerment found in the current study with those Zimmerman's Theoretical Framework of Individual Psychological Empowerment (Zimmerman, 1995, p.588) and the Grounded Theory literature. review The discussion chapter argued that empowerment found in the current study was a multidimensional aggregate construct of Intrapersonal, Interactional and Behavioural components. The discussion recognised important differences between Zimmerman's Theoretical Framework and the components of empowerment found in the current study and Grounded Theory literature review. In light of these differences, the discussion chapter argued for a new framework that would be suitable for the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre. Based on the findings of the current study the researcher developed a new Burrswood Conceptual Framework of Empowerment for the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre. Personal qualities such as perceived control, perceived competence, motivation, coping self-efficacy, positive attitude and realising potential were considered to be the Intrapersonal components to the Burrswood Conceptual framework of Empowerment. The Interactional components of the Burrswood Conceptual Framework of Empowerment consisted of interactions with peers and professionals, enablement and critical awareness and the Behavioural components were composed of active coping and participation.

Chapter 11

Limitations

Chapter 11: Limitations

This chapter will discuss the limitations of this study: critically evaluate the research design and discuss the influence, potential and actual, of these limitations on the findings, interpretation of results, and implications of outcomes for prospective users. Strategies will be suggested that could forestall or avoid these limitations in future research.

The limitations can be described as inevitable and preventable. Their categorisation was based on whether the researcher could have exercised control over the limitation. The preventable limitations are those that could have been avoided with better planning at the early stages of the research design and predicting the potential issues. The inevitable limitations are those that are beyond the control of the researcher because they are linked to the research aim and became integral to the research design.

A limitation that is deliberately introduced in the research design to confine the focus of the study is known as delimitation (Price and Murnan, 2004). This may be considered inevitable because of its connection to the purpose of the study. For example, delimitation of recruiting only people with Multiple Sclerosis who completed the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre was self-evidently necessary. Therefore, this delimitation resulted in recruiting participants from a geographic region with particular experience. This meant that the concepts found in this research might not be applicable to people with MS who did not attend this aquatic physiotherapy programme.

The core category generated from the data represented the views of a small group of research participants. The data analysis suggested that participants were interested in the continued provision of the aquatic physiotherapy service at the Burrswood Centre. Because of this personal interest it is possible that participants were biased. They might, perhaps subconsciously, have overemphasised the benefits of the aquatic programme and expressed views that would support the continuation of this service.

The researcher was not employed by the Burrswood Health and Wellbeing Centre. The researcher being external to the organisation might have decreased the issue of power imbalance between participants and researcher. However, participants were aware of the researcher's active role as a member of the Multiple Sclerosis Aqua Research Team.

This might have contributed to the social acceptability bias where participants provide positive views of the effects assuming that this is what the researcher wants to hear.

Use of words 'carry-over effect' in the aim and title of the study might have suggested a preconception that there would be carry-over effects from attending the aquatic physiotherapy programme. Though it was necessary to delimit the research to the aim, the specific focus might have limited exploration of any alternative views participants might have had about this intervention. For example, people with MS who did not find any carry-over effects from the programme or did not particularly enjoy the intervention might not have come forward to participate in this research.

11.1 Participation Bias

The findings of the study might have been influenced by the participation bias. The initial volunteer participants of this research were regular attendees of the group aquatic exercise classes at the Burrswood Centre. These research participants have vested interest in the continued provision of the aquatic exercise at the Centre. Because of the Theoretical Sampling methods implemented in this Grounded Theory research, the initial participants' responses directed the selective sampling which subsequently resulted in the recruitment of more participants from the group exercise classes running at the Centre. The initial participant responses thereby influenced the development of themes which primarily represented their biased views. Thus, the selective sampling process contributed to participation bias. This bias has the potential to exclude individuals who did not find the intervention helpful (Smith and Noble, 2014).

11.2 Response Bias

The initial participants and the follow-up recruits were largely from the group aquatic exercise classes. Because of their group association it is possible that the participants were influenced by social desirability response bias (Grimm, 2010). Participants also knew that the researcher is a senior lecturer and a member of the Multiple Sclerosis Aqua Research Team. Researcher's presence might have biased the responses (Creswell and Creswell, 2018). Participants might have provided responses that are desirable instead of presenting their true opinions (Van de Mortel, 2008). Therefore it is

possible that their responses have overstated the positive carry-over effects of the aquatic intervention.

Due to the constraints on the number of available prospective participants and the primary focus of this study there was limited flexibility in implementing the theoretical sampling methods. Further to saturate the components of empowerment and its associations with the physical activity of people with MS, it would have been ideal to expand the theoretical sampling beyond the aquatic physiotherapy service of the Burrswood Health and Wellbeing Centre. Because of inadequate saturation, the cause and effects association of empowerment with physical activity cannot be established.

11.3 Gender Distribution

It is important for the researchers to acknowledge differences in the specific needs of men and women and adapt the interventions accordingly (Tannenbaum, Greaves and Graham, 2016). One of the prominent limitations observed in this research was the considerable difference in the gender distribution of the participants. Though the study did not deliberately predetermine participation according to gender, 16 of the 17 participants were female. Although the responses of the male participant did not show any noteworthy points for the development of higher-level categories of the empowerment framework, his views contributed to the development of lower-level concepts and discussion on facilitating and deterring factors. Because of these valuable contributions, the findings could not be viewed exclusively from a feminist standpoint. Whilst it was not a requirement of qualitative research to have equal representation of both genders, the limited representation of male participants meant that the study implications could not be discussed from the point of view of male patients with MS.

11.4 Researcher bias

Prior to this study the researcher had limited experience in qualitative research methods. This lack of experience in qualitative methods was particularly evident during the early stages of data collection. The debriefing sessions with the supervisors uncovered implicit preconceived assumptions about the topic and lack of experience. Following reflections and memos, the researcher modified the subsequent interview questions so that they did not lead participant responses towards the prior assumptions of the researcher.

Although the debriefing sessions helped to disclose the possible areas of researcher bias, the use of qualitative methods to their full potential might not have been achieved by the novice researcher.

Because of the prolonged association of the researcher with the Multiple Sclerosis Aqua Research Team projects at the Centre, it is possible that the researcher has prior beliefs and assumptions about the carry-over effects that might have found their way into the data (Chenail, 2011; Anderson, 2010). This was also the first time the researcher used the Classic Grounded Theory approach, learning the procedures while implementing them. It is acknowledged in the research community that Grounded Theory methods are challenging (Cooke, 2014) and they can be confusing to the novice researcher (Evans, 2013). Data collected were filtered through the subjective interpretation of the researcher and there is a possibility of researcher influencing the findings (Creswell and Creswell, 2018). All of the above complexities could have contributed to the researcher bias.

The author was the only researcher involved in completing the online data base searches, screening and exclusion of the studies for both the literature reviews. In addition to this, researcher was also the only person involved in the selection, data extraction and critical appraisal of the studies included in the Grounded Theory Literature Review. It would have been ideal to include a second reviewer and complete a dual review process (Stoll, et al., 2019).

11.5 Limitations of the 'Letter-to-a-friend' Method

To limit researcher bias the 'letter-to-a-friend' method was adopted. Besides the intention of limiting the researcher's influence on interview questions the letters were also intended to encourage friendly communication between the researcher and participant. However, the written language used in the letters was more formal and letters were brief than the study intended. The reason for the limitation of formality could be that the participants were aware that the researcher is a physiotherapy lecturer and had been an active member of the Multiple Sclerosis Aqua Research Team. Therefore, they may have experienced difficulty in accepting the researcher as a virtual friend.

The possibility for the brief response was that the letters in this study were not planned as reciprocating discussion. Because of this, the letter-to-a-friend method was limited in its usefulness as the opportunity for the researcher to probe into the details of

the responses (Charmaz, 2014). This limited the opportunity to further investigate the concepts identified in the letters. Although the follow-up letters were planned, this opportunity was not utilised because of the brevity of the information gathered in the letters.

11.6 Problems with Recruitment

Besides the challenges of implementing Classic Grounded Theory sampling, the researcher also faced numerous challenges in recruiting participants. The study was conducted to explore, better understand and explain the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy offered by a specialist service of physiotherapy at the Burrswood Health and Wellbeing Centre. This meant the overall sample pool available for the study was considerably small (below 150) and the number of suitable participants was further limited by the inclusion and exclusion criteria.

Following full ethics approval in February 2015, the recruitment procedures were implemented. Between March 2015 and January 2016, a small number of potential participants responded, and the recruitment resulted in only eight participants. During the data analysis it became apparent that the study needed more interview data sets in order to generate patterns from the concepts. Demonstrating patterns of association between the data was one of the essential requirements for developing categories in the Classic Grounded Theory. Following discussion with clinicians at the Centre the researcher learnt that although many patients had shown interest in the study, they might not have volunteered to participate due to difficulties in arranging transport for face-to-face interview. Many potential participants of the study were dependent on others for their transport and mobility. The data collected to that point also suggested that transport was one of the major barriers to regular participation in exercise. The researcher realised that the recruitment plan should have been more circumspect and anticipated the potential practical problems that might well hinder the data collection procedures (Newington and Metcalfe, 2014). As the researcher explored the options for resolving the difficulties of recruitment, it was acknowledged that expanding data collection to other Centres would not be feasible as the aquatic physiotherapy programme offered for people with MS by the Burrswood was a specialist programme that was not offered locally. Further reading and tutorials with supervisors prompted consideration of

Telephone and Skype/FaceTime interviews as flexible alternative data collection methods for this study. Further permission to incorporate these additional methods was then sought and granted from the Ethics in February 2016. Their subsequent adoption in the latter part of the study improved the recruitment. But the addition of alternative data collection methods meant that there was insufficient time to pilot the methods and test their efficacy.

During this study, the researcher learnt that research at doctoral level was highly challenging and some aspects of the research procedures were beyond the control of the researcher. With experience and with deeper reading on the complexities of conducting research, however, some of the more common problems encountered could be anticipated and alternative strategies put in place. For example, during the recruitment stages access to potential participants at the Burrswood Centre became a challenge because the gatekeeper retired. Because the researcher is not employed by the Centre the gatekeeper was instrumental in identifying potential participants for the theoretical sampling and giving access to patient records (Archibald and Munce, 2015). This lack of support during the recruitment stages became a significant problem. Instead of becoming totally dependent on one individual the researcher could have developed alternative contacts at the Centre who could have supported the research in the absence of the gatekeeper.

11.7 Not a Purist Version of Classic Grounded Theory Research

According to the purist's view, the Classic Grounded Theory approach should follow participants' concerns to the extent that subsequent data collection delimits the development of the theory to these concerns (Glaser, et al., 2013). Although this study explored the concerns of the participants while exploring the carry-over effects of aquatic physiotherapy, subsequent data collection was not simply limited to these concerns. Due to the Pragmatic approach implemented in this study, recruitment did not go beyond the substantive area to follow the trail of concerns. This limitation was inevitable because the study started with the aim of exploring the perceptions of people with MS about the carry-over effects of aquatic physiotherapy rather than the concerns of participants about the intervention. This meant the study could not implement the purist version of the Classic Grounded Theory approach.

Chapter 12

Recommendations

Chapter 12: Recommendations

Discussion of the findings and limitations identified two recommendations. Depending on their area of applicability, the recommendations are divided, and described under two subheadings: Recommendations for Aquatic Physiotherapy and Recommendations for Research.

12.1 Recommendations for Aquatic Physiotherapy

The aim of the research was to explore, better understand and explain the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. In light of the research findings the following recommendations are proposed. Because of the specialist focus of the current study, these recommendations are specific to the aquatic physiotherapy service at the Burrswood Health and Wellbeing Centre. These might be applicable to similar services providing aquatic physiotherapy for people with MS. The Burrswood Conceptual Framework of Empowerment developed during this research represented the views of a small group of research participants. Therefore, the applicability of this framework requires further exploration and testing. In the current research, individual empowerment was found to be the core theme representing the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy.

Learning, understanding and the enabling achieved from the aquatic physiotherapy programme improved the perceived control and competence of the participants over a wide range of their functional activities. Knowledge gained during aquatic physiotherapy at Burrswood Health and Wellbeing Centre helped research participants with MS to change their thinking about their abilities and realise their own potential to participate in more activities. Therefore, physiotherapists could focus their resources on the patient education and improve aspects of learning, understanding and knowledge of people with MS.

The current study found numerous activity examples in the data that suggested empowerment as the carry-over benefit of aquatic physiotherapy programme for research participants with MS. Development of a positive attitude as an intrapersonal quality facilitated the process of empowerment in participants by not only enhancing their intention to participate in the planned behaviour but also by bringing about favourable changes in their behaviour. Participants in this doctoral research expressed a desire to retain the benefits achieved from the aquatic physiotherapy programme through self-management. Their improved understanding of the importance of an active lifestyle also became a motivating factor. They also demonstrated critical awareness by identifying, acknowledging and managing the resources. All of these components contributed to the empowerment. People with MS could be provided with the necessary resources and skills so that they can develop positive attitude, participate in new activities and continue self-management.

The process of empowerment encompasses the element of control over participants choices and making decisions about changes in their behaviour. Aquatic physiotherapists could encourage people with MS to take control of their goal setting, treatment planning and long-term management of their MS after completing the aquatic physiotherapy programme. Although the power of control and the final decision should be with the patients, the process of empowerment could be initiated, supported, facilitated, organised and encouraged by aquatic physiotherapists.

Future aquatic physiotherapy programmes for people with MS could be designed as empowerment-based interventions. Their main purpose could be the achievement of empowerment by the service user. At the individual level empowerment could be considered as intrinsic subjective attribute achieved by the person. Besides the organisational level commitment, the process of empowerment requires motivation, active engagement and participation of the service user. Therefore, this process cannot be achieved by passive modes of intervention.

The intrapersonal qualities of individual empowerment are activity-specific. Aquatic physiotherapists could consider the relative value each individual assigns to the activities of their lives. To gain a greater understanding of the concept of individual empowerment it would be imperative to explore the meaning of “empowerment” from the perspective of

the individual. Aquatic physiotherapists should ask participants about their preferred activities and the related life domains in which they would like to achieve empowerment.

The Burrswood Conceptual Framework of Empowerment developed in this study was grounded in the participants' views and it was developed from the data collected from a small group of research participants living with MS. The data used for the development of this framework were generated by using the qualitative inductive research approach. Hence, this conceptual framework might be applicable to people with MS and could be considered when planning interventions for them. However, because of the limitations of participation bias and response bias identified in this research, the researcher suggests that aquatic physiotherapists should evaluate this framework before considering its applicability to other settings and wider MS population.

Measurement, Goal Setting and Follow-ups

Although the findings of this research represent the views of a small group of people with MS, they indicated that the aquatic physiotherapy programme improves MS impairments such as muscle weakness, abnormal posture, poor sitting and standing balance and difficulty walking. These improvements enabled research participants to perform many activities and participate in skills which were pertinent to their lives. The benefits gained can be carried over to the personal life activities and domains of individuals. The improvements gained in physical abilities made research participants feel confident and competent. The carry-over benefits enabled them to participate in more challenging, social and functional activities that were meaningful and important to them.

Active participation is considered as the product of empowerment process and the physical benefits contributed to skills development and skills transfer across domains. Many research participants also demonstrated positive changes in their behaviour as carry-over benefit of attending the aquatic physiotherapy programme at Burrswood. The intervention has the potential to gain empowerment and improve the self-management behaviour of people with MS.

During the initial assessment, aquatic physiotherapists could encourage people with MS to discuss their impairments, activity and participation limitations and the impact of these on the various domains of their lives. It will be useful for aquatic physiotherapists to encourage patients in exploring and better understanding the possible reasons for their limitations and focus the interventions on those specific aspects.

Besides measuring the impairments, aquatic physiotherapists could also measure the 'carry-over effects' on the activity and participation domains of people with MS. Aquatic physiotherapy programme could consider encouraging people with MS to set the treatment goals beyond their impairments and consider activity and participation domains as part of their goal-setting process. Taking into consideration of the differences between task self-efficacy and coping self-efficacy, it might be useful for aquatic physiotherapists to consider both of these when planning aquatic physiotherapy programmes. For example, task self-efficacy of a specific activity could be the short-term goal and the long-term goal could be the achievement of coping self-efficacy.

Aquatic physiotherapists could provide further follow up appointments after the aquatic physiotherapy programme to evaluate the retention of benefits and engage in discussion on how to carry-over the benefits achieved from the programme. There is evidence to suggest that the majority of MS population are using internet and social media for seeking information. Aquatic physiotherapists could take advantage of these online platforms for providing education, offering follow-up appointments and discussing day-to-day concerns of patients on retaining the carry-over benefits.

Research participants of this study indicated that they experienced severe levels of exhaustion soon after each session of aquatic physiotherapy. Though exhaustion from the aquatic exercise was temporary, according to research participants it had a considerable impact on their lives and their overall experience of exercise in water. Some expressed grave concerns about their exhaustion and chose not to participate in any further aquatic exercise. Therefore, while planning water-based exercises, it is sensible for aquatic physiotherapists to take careful consideration of the properties of water and the impact of aquatic exercise on MS fatigue levels. Because of the nature of MS problems, the intensity, duration, frequency and type of exercise in water need to be planned on an individual basis and the perceived level of exertion (before, during and after) should be monitored frequently so that the exercise does not produce undesirable experience such as exhaustion.

Aquatic physiotherapists could prepare people with MS for the temporary adverse effects of participation in aquatic exercise. Aquatic physiotherapists could be proactive in signposting patients about the potential impact of exhaustion on their lives for the remainder of the day after aquatic physiotherapy. Aquatic physiotherapists could encourage people with MS to think about the support they might require at home on the

day of the session. The Burrswood Health and Wellbeing Centre could also explore opportunities for arranging free transport for people who cannot drive back home due to exhaustion. The service could consider employing more assistants who could support participants in changing their clothes after a session in the pool.

After completing the individual aquatic physiotherapy programme, some research participants indicated joining the group exercise classes that were running at the Centre. Research participants reported benefits of social interaction within the group and emphasised the benefits of peer support and learning. Interactions with peers can contribute to empowerment of people with MS. In addition to providing individualised aquatic physiotherapy sessions as part of the programme, aquatic physiotherapists could also consider interactive group exercise and education sessions. Group therapy programmes with the aim of enhancing the life of people with a common problem might benefit all individuals in the group by empowering them over that common issue. Aquatic physiotherapists could organise group therapy programmes and encourage group interaction among people with MS. Group interaction can help people with MS to learn from their peers and develop critical awareness of shared difficulty and identify solutions. Aquatic programmes could encourage more group activities for people with MS so that they have the opportunity to learn and gain support from their peers.

12.2 Recommendations for Research

The researcher identified gaps in current knowledge that require further exploration by future research. Areas for future research are revealed and identified from the findings and limitations of this thesis and by taking into consideration of the available literature on the empowerment of people with MS. This section will present recommendations for future research and seek to justify them. The researcher believes knowledge and understanding of the carry-over effects of aquatic physiotherapy and empowerment of people with MS could be expanded by addressing these research recommendations; that such increased knowledge and understanding will improve the effects of aquatic physiotherapy for people with MS.

The Burrswood Conceptual Framework of Empowerment was developed from the responses of a small group of people with MS who participated in the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre. The convenient sampling methods used in this research recruited participants who had

experience of aquatic physiotherapy. While the sampling methods addressed the research topic under investigation, the findings were limited to people with MS and experience of this aquatic physiotherapy. Because of this limited scope and applicability of the findings of this research, the conceptual framework generated in this research is considered to be less than 'micro-range theory'. Further research and progression of knowledge is necessary to advance the level of Burrswood Conceptual Framework of Empowerment to a micro-range theory. This could be achieved by conducting the following future research.

Firstly, inductive qualitative research approaches could expand the knowledge by conducting further Classic Grounded Theory research. The components of empowerment identified in this research could be further explored and refined by expanding the theoretical sampling to the wider population. The initial stage of sampling could focus on recruiting people with MS who have had experience of empowerment or disempowerment as a consequence of aquatic physiotherapy at different aquatic physiotherapy settings. In the latter stages, the advancement of theory could be achieved by recruiting adults with other long-term neurological conditions who completed aquatic physiotherapy programme and exploring these concepts.

Secondly, quantitative research using deductive approaches will be necessary to understand the validity and applicability of the Burrswood Conceptual Framework of Empowerment to wider MS population and people with other neurological conditions. Thirdly, to expand knowledge and understanding of the carry-over effects of the aquatic physiotherapy programme, future research could implement a similar service to other neurological conditions and explore the carry-over effects of this intervention on the empowerment of people with other neurological conditions. Further research could use mixed-methods research designs by combining inductive and deductive research approaches to explore the effects of the aquatic physiotherapy programme.

The Burrswood Conceptual Framework of Empowerment in its current form is descriptive and to certain extent it could be explanatory. This framework provides description of the different components and hypothesises the association between them. Although it might be able to explain the combined effect of components on achieving the empowerment phenomenon, it is not able to provide valid conclusions on the cause and effect relationship between the components and relative value of each component of the phenomenon. In its current state this framework is not able to predict the outcomes. To advance the level of knowledge of the Burrswood Conceptual Framework of

Empowerment to a micro-range level theory it needs to become predictive. Further research is necessary to understand the cause and effect relationship between different components of empowerment.

Knowledge generated in this research used qualitative inductive approaches. The variables found in this research need to be verified by conducting quantitative research using deductive approaches. Further testing and exploration of the components of the framework will help to advance the knowledge and generate a micro-range theory. The findings of this doctoral study did not explicate the associations between components of the Burrswood Conceptual Framework of Empowerment. Future research could conduct a structure analysis and explore the significance of individual components and their relative value for the process of empowerment. Future research could aim to answer the following questions:

- What are the associations between the intrapersonal, interactional and behavioural components of empowerment?
- What are the associations between the intrapersonal qualities of empowerment?
- If there are associations between the intrapersonal qualities, is there a sequential hierarchy of those qualities?

Although the Burrswood Conceptual Framework of Empowerment provides a model to understand individual empowerment, the validity and practical utility of this framework needs to be tested by future research. To understand the functional utility a suitable outcome measure is required. Therefore, the immediate priority for future research would be to develop a patient reported outcome measure based on the components of this framework and test the validity, reliability, sensitiveness and responsive of this new measure.

The empowerment process found in this research suggested its association with better self-management of MS. Future research could explore the role of empowerment in the modification of behaviour of people with MS. The following hypothesis could be explored

- There will be a statistically significant positive correlation between completion of the aquatic physiotherapy programme and the modification of behaviour of people with MS.
- There will be a statistically significant correlation between level of empowerment and modification of behaviour.

Although the findings of the current research suggested that the aquatic physiotherapy can facilitate empowerment in people with MS, there is limited prior evidence on the effects of physiotherapy on the empowerment of patients. The Grounded Theory literature review conducted as part of this doctoral research found some evidence relating physiotherapy with the patient empowerment. Because none of these studies were related to people with MS they could not be included in the synthesis of this research. Future research could explore the effects of physiotherapy on patient empowerment.

Patient enablement is one of the core competency skills of Occupational Therapists. Although aquatic physiotherapy programme has been helpful for enhancing enablement of research participants, there is limited understanding of the effects of collaboration of physiotherapy with occupational therapy. Therefore, it would be useful for future research to compare the aquatic physiotherapy programme with a joint physiotherapy and occupational therapy programme and evaluate their effects on enablement.

The majority of people with MS who participated in this research benefited from the aquatic physiotherapy programme. Therefore, the themes developed from the experience of the participants are shaped by the views of those that benefited. It is plausible that people with MS who did not benefit from the programme might have different opinions of the effects. This indicates a clear gap in the knowledge and understanding of this area. It would be important for aquatic physiotherapists to understand and identify people with MS who may not benefit from aquatic physiotherapy. Further research in this area would be beneficial in improving understanding of the appropriateness of aquatic physiotherapy for different people with MS. Therefore, future research could explore the experience of people with MS who did not benefit from the aquatic physiotherapy programme.

The majority of research participants in this study were leading a physically active life. Thus, the facilitating and deterring factors of physical activity and aquatic exercise identified in this research were limited to the opinions of participants who were already interested in being active. There is potential for further exploration of the facilitating and deterring factors by recruiting people with MS who are inactive. Although some participants benefited from the programme, they did not continue or participate in any form of regular exercise. Future research could explore the reasons for this lack of improvement.

Although MS is more prevalent in the female population, it is also important for physiotherapists to understand the perceived effects of aquatic physiotherapy from the perspective of men. There is a need for future research to recruit more men with MS and explore their views on aquatic physiotherapy.

Although this study was limited by the views of a small group of participants, this study found that patient education and patients acquiring knowledge to be important elements that contributed towards the process of empowerment. The discussion also identified adequate evidence that supported the role of acquiring knowledge in the process of empowerment. Although this study identified the role of physiotherapists and peers in the patient education and patients acquiring knowledge, the current understanding of different components of this process is not adequate to make clinical recommendations. There could be further research explicating different components of education and its role in the process of achieving knowledge and identifying what works for whom.

Empowerment is influenced by population characteristics. The current study did not explore the relationship between the personal attributes of individuals and the influence of these on achieving the process of empowerment. It would be useful for future studies to explore the associations between these. It is not clear why only some research participants developed coping self-efficacy and were able to transfer skills beyond the therapy setting. This gap in the understanding of the coping self-efficacy generated the following future research questions:

- How can we design interventions that can transform task self-efficacy into coping self-efficacy?
- What external factors and personal attributes contributes to the transformation of self-efficacy into coping self-efficacy?

Chapter 13

Contribution to Knowledge

Chapter 13: Contribution to Knowledge

The findings of this research make an important contribution to the advancement of knowledge in the field of aquatic physiotherapy and Multiple Sclerosis (MS). The development of a new Empowerment Conceptual Framework as part of this doctoral study is considered a contribution to the substantive area of knowledge. This chapter will provide explanations that support the researcher's claims for the contribution of this research in expanding the body of knowledge of aquatic physiotherapy and Multiple Sclerosis.

13.1 Identified Gaps in Knowledge

The preliminary literature review completed during the design stages of this research identified gaps in the knowledge of the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. The review did not find any qualitative studies that explored the carry-over effects of aquatic therapy from the perspective of people with MS. Further discussion with clinicians, researchers and people with MS echoed the need to explore the carry-over effects of aquatic physiotherapy. None of the previous studies explored this topic from the point of view of people with MS. The absence of knowledge and lack of understanding of perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy provided a greater justification for designing a qualitative study that explored the experience of people with MS. This gap in knowledge and the lack of qualitative study attests the need to conduct research on this topic and expand knowledge. Discussion of the findings identified further gaps in the knowledge, developed new hypotheses, research questions and made recommendations for future research.

13.2 Expanded Knowledge

The findings of this research generated a new body of knowledge on the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. The codes generated during the research were inductively developed from quotations of the participants and grounded in the data. The concepts generated in this research provided

new insight into the views of participants. The categories on *Realising Potential, Positive Attitude and Enablement* generated a new core category on *Empowerment*. The generation of codes, categories and a core category from the experience of participants developed a new body of knowledge in the field of physiotherapy for people with MS. This research being one of the first qualitative studies that explored the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy, its results have made a contribution to the development of new knowledge.

As part of this doctoral study, the researcher developed a novel Burrswood Conceptual framework of Empowerment depicting the concept of empowerment as a multidimensional aggregate construct. This new model provides a better understanding of the intrapersonal, interactional and behavioural components of empowerment of people with MS. The flexible design of this framework allows the components to be readily adaptable to services from different contexts and with different populations. Thus, the Burrswood Conceptual framework of Empowerment has the potential to be adaptable to people with other long-term neurological conditions. The development of this new conceptual framework has made a contribution to the expansion of the body of knowledge of physiotherapy.

13.3 Letter-to-a-friend

This study employed 'letter-to-a-friend' as a method of data collection. It is a new method of data collection in the field of physiotherapy. During the design stages of this research, the literature search for this method identified only a few publications. 'Letter-to-a-friend' as a method of data collection has not been used frequently in health sciences research. Further discussion with qualitative researchers, communications with other health sciences faculties, and an extended literature search for other forms of letter-writing data collection methods identified a few research studies from Education, Clinical Psychology and Social Policy Research. However, the researcher did not find any studies in the field of physiotherapy that employed this method. This gap provided an opportunity for this doctoral study to employ this method in physiotherapy research, to gain first-hand experience and knowledge in the 'letter-to-a-friend' method. The researcher developed a step-by-step procedure for implementing this method and provided new insights into its strengths and limitations.

Chapter 14

Conclusion

Chapter 14: Conclusion

This chapter will start with a section that revisits the aim, objectives and research questions proposed at the beginning of this research. In this section the outcomes of this study are reviewed to determine whether the research questions answered and the primary aim and intended objectives achieved. A summary is then offered of key findings of this research.

14.1 Aim, Objectives and Research Questions

This research, completed as part of a Doctoral study, has accomplished the primary aim and objectives identified at the outset. The aim of the research was to explore, better understand and explain the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. This research accomplished the primary aim by achieving the three key objectives of this study (O1, O2, O3). This research achieved its objectives by using the Pragmatic research approach and the qualitative Classic Grounded Theory methodology. The researcher recruited participants who had completed a programme of aquatic physiotherapy at the Burrswood Health and Wellbeing Centre and explored their perceptions about this intervention (O1). The findings suggested that there were carry-over benefits of attending this programme for people with MS. The research found three categories of carry-over effects: *Realising Potential*, *Positive Attitude*, *Enablement* and a core category of *Empowerment*. The discussion of the findings with the existing literature improved the understanding on the concept of empowerment (O2). The researcher developed a novel Burrswood Conceptual framework of Empowerment that explained the association between different components of empowerment (O3). This new Empowerment Conceptual Framework expanded knowledge of the carry-over benefits of a programme of aquatic physiotherapy from the point of view of research participants and provided a better understanding and explanation of the various components of individual empowerment. Thus, this Doctoral study accomplished the primary aim and objectives of this research.

14.2 Summary of key findings

This section presents a summary of the major findings of this research, organised in five subsections. The first three provides a summary of the three categories found in this research: *Realising Potential*, *Positive Attitude*, and *Enablement*. The fourth subsection presents a summary of the concept of *Empowerment* that was generated as the core category from the findings of this research. The final subsection provides an overview of the Burrswood Conceptual framework of Empowerment.

The chief findings of this study are generated from the data collected from a small group of volunteers who might have vested interest in continuing the provision of aquatic physiotherapy service at the Burrswood Centre. Although this research found carry-over benefits of participating in the aquatic physiotherapy programme for people with MS, the findings could have been influenced by the positive views presented by a small group of research participants. Because of the participation and response bias limitations, these findings could not be considered as a holistic representation of the views of people with MS.

14.2.1 Realising Potential

The patient education and advice elements of the programme provided useful information for research participants. They learned new information and gained better understanding of their Multiple Sclerosis. The information gained during the programme helped research participants in better self-management of their MS. The new knowledge gained during the programme was retained by the research participants. The programme also helped research participants to recognise their physical abilities and limitations. Research participants realised their own potential and participated in more functional and social activities.

14.2.2 Positive Attitude

Besides the physical benefits, research participants reported there were psychological benefits of attending the aquatic physiotherapy programme. Participants achieved psychological benefits such as 'positive thinking' and 'positive feeling'. They also developed a 'can-do' attitude. The psychological benefits carried over and continued

after completion of the programme. Overall, research participants changed their attitude to MS and developed a positive attitude in managing their MS.

14.2.3 Enablement

The carry-over benefits achieved in the physical and psychological domains enabled research participants to engage in meaningful activities such as functional, social and exercise. Research participants improved in some of their MS problems such as muscle weakness, lack of balance, stiffness and walking difficulty. They also gained psychological benefits such as overcoming fear of fall and improved confidence in participating in functional and social activities. The physical and psychological benefits achieved from the aquatic physiotherapy programme carried over to functional activities on land. Research participants gained carry-over benefits in their impairments which enabled them to participate in a range of meaningful activities, such as walking, exercising and socialising.

14.2.4 Empowerment

Although there are different carry-over benefits associated with completing the aquatic physiotherapy programme for people with MS, the concept of empowerment was found to be the core theme of the carry-over benefits. Research participants became more pro-active and made changes to their self-management. They implemented problem solving, explored opportunities for regular exercise, and tried and engaged in the new self-management strategies. They treated their MS differently and took a tougher approach to it. Research participants became confident and independent in their ability and accepted new responsibilities and participated in more functional and social activities. Research participants made positive behavioural changes to their physical activity and participated in regular exercise. They gained control over MS problems and put themselves in charge of their MS. All of these changes demonstrated empowerment as the chief carry-over benefit of the aquatic physiotherapy programme.

14.2.5 Burrswood Conceptual Framework of Empowerment

Based on the discussion of the findings with the existing literature a new Burrswood Conceptual framework of Empowerment was developed during this doctoral research. This new model explicated numerous components associated with the process of empowerment. The carry-over effects associated with empowerment were grouped into three main components and were presented as intrapersonal, interactional and behavioural components. This model expanded the knowledge and understanding of the carry-over effects of aquatic physiotherapy for people with MS. The flexible design of this multi-dimensional, aggregate framework allows the components to be readily adaptable to different services and populations.

14.3 Summary of Thesis

The thesis provided a brief overview of Multiple Sclerosis, the researcher's professional experience and the context of this research with the aquatic physiotherapy programme at the Burrswood Health and Wellbeing Centre. The researcher justified the need for completing a preliminary literature review on the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. The preliminary literature review identified gaps in the knowledge and guided the researcher in formulating the research questions and aim of this research. The aim of the research was to explore, better understand and explain the perspectives of people with Multiple Sclerosis about the carry-over effects of aquatic physiotherapy. Pragmatism was identified as the most suitable approach for achieving the aim. During the course of this doctoral study, researcher underwent a significant change in his beliefs about the knowledge and reality. The researcher changed his perspective from a post-positivist position to pragmatist position. The researcher identified the Classic Grounded Theory methodology to be the most suitable approaches for carrying out this research. The study recruited people with MS who completed six sessions of 1-to-1 aquatic physiotherapy at the Burrswood Health and Wellbeing Centre. Letter-to-a-friend and semi-structured interview data collection methods were employed. The study recruited and collected qualitative data from 17 participants. Data analysis was completed by using the Constant Comparative Analysis. Scientific rigour was ensured by adhering to the principles of credibility, auditability, fittingness and reflexivity. The findings generated three categories: *Realising Potential, Positive Attitude and Enabling*; one core category: *Empowering*, and two theoretical codes: *facilitating and deterring factors*. The researcher conducted a Grounded Theory literature review to identify and integrate the findings of

this research with the existing literature. The researcher developed a new Burrswood Conceptual framework of Empowerment that could be applicable to the aquatic physiotherapy service for people with MS at the Burrswood Health and Wellbeing Centre. However, this framework requires further testing and corroboration as it was developed from the data collected from a small group of research participants. This doctoral research made a contribution to the advancement of knowledge of aquatic physiotherapy and Multiple Sclerosis by generating a new conceptual framework. The study proposed some recommendations that might be suitable for physiotherapy practice and conducting future research. The outcomes of this research highlighted some generic concepts that might be useful for physiotherapy services for people with Multiple Sclerosis. The generic concepts identified in this research might be relevant to other long-term neurological conditions. These need to be tested before making any recommendations because the findings represent the views of a small group of participants from a single private aquatic physiotherapy centre located in Kent. Although the findings of this research suggested carry-over effects of aquatic physiotherapy programme, it is important to acknowledge the limitations of the study before considering their applicability to wider contexts and population.

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Appendices

Appendix 1: Faculty Research Ethics Panel Approval Letters

18 February 2016



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Dear Krishna

Re: Application for Ethical Approval

Principal Investigator: Krishna Garikipati

Project Number: 14_15 007

Project Title: The carry-over effects of aquatic physiotherapy for people with Multiple Sclerosis.

Thank you for your email of 03 February 2016 and for further information regarding an amendment to your project to add more interview data collection methods. This has been reviewed by the Chair of the Faculty (of Health, Social Care & Education) Research Ethics Panel (FREP) in advance of the next scheduled meeting in March.

I am pleased to inform you that the amendments have been approved under the terms of Anglia Ruskin University's Research Ethics Policy (Dated 23/6/14, Version 1), as given on 23 February 2015.

Ethical approval is given for a period of 3 years from 23 February 2015.

It is your responsibility to ensure that you comply with Anglia Ruskin University's Research Ethics Policy and the Code of Practice for Applying for Ethical Approval at Anglia Ruskin University, including the following:

- The procedure for submitting substantial amendments to the Panel, should there be any changes to your research. You cannot implement these amendments until you have received approval from FREP for them.
- The procedure for reporting adverse events and incidents.
- The Data Protection Act (1998) and any other legislation relevant to your research. You must also ensure that you are aware of any emerging legislation relating to your research and make any changes to your study (which you will need to obtain ethical approval for) to comply with this.
- Obtaining any further ethical approval required from the organisation or country (if not carrying out research in the UK) where you will be carrying the research out. Please ensure that you send the FREP copies of this documentation if required, prior to starting your research.

- Any laws of the country where you are carrying the research and obtaining any other approvals or permissions that are required.
- Any professional codes of conduct relating to research or requirements from your funding body (please note that for externally funded research, a Project Risk Assessment must have been carried out prior to starting the research).
- Completing a Risk Assessment (Health and Safety) if required and updating this annually or if any aspects of your study change which affect this.
- Notifying the FREP Secretary when your study has ended.

Please also note that your research may be subject to random monitoring.

Should you have any queries, please do not hesitate to contact me. May I wish you the best of luck with your research.

Yours sincerely



Dr Sarah Burch
For the Faculty (of Health, Social Care & Education) Research Ethics Panel

T: 0845 196 2560

E: sarah.burch@anglia.ac.uk

cc:

Dr Leslie Gelling (Supervisor)
Beverley Pascoe (RESC Secretary)

23 February 2015



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Dear Krishna

Re: Application for Ethical Approval

Principal Investigator: Krishna Garikipati

Project Number: 14_15 007

Project Title: The carry-over effects of aquatic physiotherapy for people with Multiple Sclerosis.

Thank you for resubmitting your documentation in respect of your application for ethical approval. This has been reviewed by the Chair of the Faculty (of Health, Social Care & Education) Research Ethics Panel (FREP) in advance of the next scheduled meeting in March.

I am pleased to inform you that your ethics application has been approved by the Faculty Research Ethics Panel (FREP) under the terms of Anglia Ruskin University's Research Ethics Policy (Dated 23/6/14, Version 1).

Ethical approval is given for a period of 3 years from 23 February 2015.

Please note: The panel suggests that you should include a lay person's definition of 'carry over effects' as part of the information for participants.

It is your responsibility to ensure that you comply with Anglia Ruskin University's Research Ethics Policy and the Code of Practice for Applying for Ethical Approval at Anglia Ruskin University, including the following:

- The procedure for submitting substantial amendments to the Panel, should there be any changes to your research. You cannot implement these amendments until you have received approval from FREP for them.
- The procedure for reporting adverse events and incidents.
- The Data Protection Act (1998) and any other legislation relevant to your research. You must also ensure that you are aware of any emerging legislation relating to your research and make any changes to your study (which you will need to obtain ethical approval for) to comply with this.
- Obtaining any further ethical approval required from the organisation or country (if not carrying out research in the UK) where you will be carrying the research out. Please ensure that you send the FREP copies of this documentation if required, prior to starting your research.

- Any laws of the country where you are carrying the research and obtaining any other approvals or permissions that are required.
- Any professional codes of conduct relating to research or requirements from your funding body (please note that for externally funded research, a Project Risk Assessment must have been carried out prior to starting the research).
- Completing a Risk Assessment (Health and Safety) if required and updating this annually or if any aspects of your study change which affect this.
- Notifying the FREP Secretary when your study has ended.

Please also note that your research may be subject to random monitoring.

Should you have any queries, please do not hesitate to contact me. May I wish you the best of luck with your research.

Yours sincerely



Dr Sarah Burch
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Dr Leslie Gelling (Supervisor)
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